- Skip to page content
- Skip to navigation
- Skip to site search

Portal Navigation
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- News
- Blogs
- Pictures
- Boat & Gear Reviews
- Buy & Sell
- Directory
- Charter
- Tuition
- Weather
- Subscribe
- Forum

PRACTICAL Boat Owner

Antifouling: Everything you need to know

- **Wed, 5 Nov 2014**
- Ben Meakins

Here's PBO's guide to preparing for, choosing and using antifouling paints, by Ben Meakins

PBO's big hull-stripping test

After a winter of hibernation it will be time to get down to the boatyard and look nervously at your boat's bottom. But just how much preparation do you need to carry out?

After a few years the thickness of paint on your boat's bottom will inevitably have built up to the point

where it has to be stripped back to the bare hull to start from scratch.

It's generally recommended that you do this every four to five years with self-eroding antifouling. The good news is that the more antifouling there is on the boat, the easier it is to remove, so it pays to wait a few years between attempts.

First of all, take a good look at the surface of the old paint. Self-eroding antifouling should, as the name suggests, gently remove most of itself during the year - but hard antifouling and many layers of eroding antifouling will eventually build up.

Signs that it's time to take it off include:

- Craters where layers of old paint mean the boat's bottom resembles a moonscape.
- Flaking where patches of paint have peeled off to leave ragged edges.
- Blisters where water is trapped under a bubble of paint - usually diagnosed by it being easy to pop. If you suspect the blisters are osmosis, get them checked out by an expert.

If the bottom isn't too bad, you can probably leave taking it all off for another year and just do some minimal preparation this year, preparing the surface and keying it, to take the new paint.

Stripping right back

If the bottom's in a bad way, it's clearly time to take the paint off.

First, a warning: it's not a pleasant DIY job. You'll rarely meet a boat owner who has enjoyed the experience, and some pay a professional blasting company to come and do the job for them.

But for most of us, economy dictates that doing it yourself is the only way. PBO's Editor David Pugh and I decided that live testing was required.

The bottom of our test boat, a Sigma 38 named Gallant, wasn't too bad, but 21 years of paint had left it pitted in some places, and the performance of the antifouling left a lot to be desired.

Owner Paul Fenner, with plans for a season of racing this year, wanted to know the best method to remove the old paint. We headed to the Elephant Boatyard on the Hamble River armed with the three main DIY removal methods available:

1. Dry scraping

2. Chemical stripping

3. DIY soda blasting

We taped out a test grid halfway down Gallant's port side and set to work, dressed to the nines in overalls, gloves, eye protection and face masks. It's a lovely job!

Afterwards, you'll need to key the surface before painting.

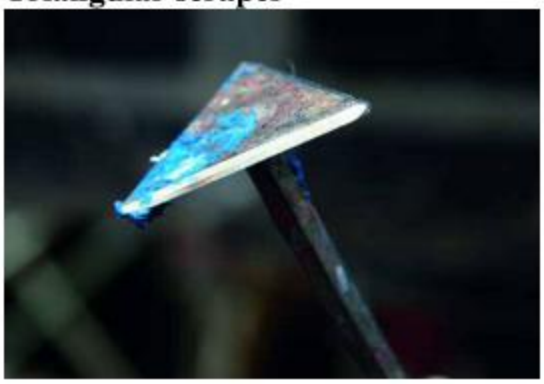
1. Dry scraping

Scraping is the cheapest way to take paint off. But which is the best scraper to use? We tried three - a traditional flat-bladed ‘push' scraper, a triangular paint scraper and a Bahco ‘pull' scraper with tungsten-carbide blades.

Flat-bladed scraper

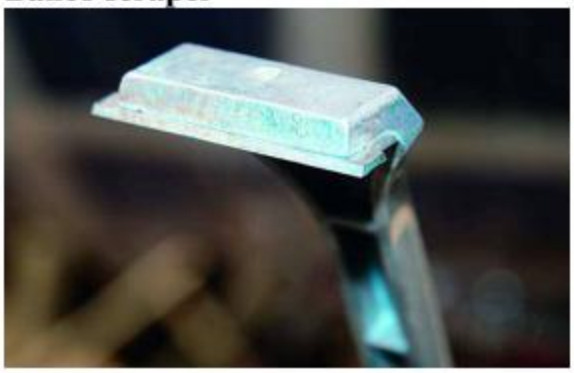
This, sharpened on a grinding wheel and with the corners ground off, was good for lifting flakes of paint off. But for heavy-duty scraping it had a tendency to dig in and try to gouge the gel coat.

Triangular scraper



Sharpened on a grinding wheel and with its pointed corners ground off, it made light work of 21 years' worth of paint. An advantage is that you have three scraping surfaces to work with, which gives you extra time before it needs sharpening with a file - which needed doing frequently.

Bahco scraper



This type of scraper uses a reversible tungsten-carbide blade. It was so sharp it shaved the paint off unless you got the blade right underneath the paint layer, and its uber-sharp edges had a tendency to bite into the paint.

But it was probably the most effective. Larger versions have a knob on top for two-handed work that allows you to put a lot of force into it. The tungsten-carbide blade stayed sharp for longer than those of the triangular scraper.

Hi-tech scrapers

PBO reader Philip Stevens uses a Bosch PSE180E electric scraper with the blade's corners rounded off. It's no longer made by Bosch but can still be found for sale on many internet sites. Cheaper alternatives are sometimes available in discount stores like Lidl and Aldi.

‘It takes a while to get a feel for the correct angles of use but is much easier and cleaner to use than a

manual scraper,' says Philip. 'A friend did the bottom of his 11.3m (37ft) Moody in a few days.'

Another option is the ProScraper, made by Gelplane International, a 'pull' scraper, similar to the Bahco, which attaches to a vacuum cleaner to suck up the scrapings as you go. It should make the job less messy and dusty.

PBO VERDICT: Scraping is quick but very labour intensive. The Bahco was the best, but the triangular scraper was effective - just keep those blades sharp!

TIPS FOR DRY SCRAPING

1. Round the corners off the blades with a file or on a grinding wheel. This will stop them digging into the gel coat.
2. Keep the blade sharp with a file or change the blades regularly. Hacking away with a blunt blade is just a waste of your energy.
3. Yards like you to clean up after yourself. Lay garden fleece, as used for protecting plants from frost, on the ground first. Water drains through, but dust and scrapings are left behind. At the end of the day you can bundle everything up and throw it away.

2. Chemical stripping

An option which takes some of the effort out of scraping is to use chemicals to strip the paint.

You can't just use any old paint stripper though - it has to be one safe for use on GRP.

We tried the three most readily available recommended products: International Paint's Interstrip AF, Owatrol's Marine Strip (formerly called Dilunet) and Removall 620 from Cirrus Systems.

Interstrip AF

PRICE: £23.99 for a 1 litre tin

This product is specifically formulated for removing antifouling. The tin's instructions recommend

leaving the product on for 10 minutes before scraping it off with a blunt wooden scraper.

'This is fine if the antifouling being removed is thin,' says International's Richard Jerram, 'But for thicker layers I would recommend that the Interstrip is left on much longer, even overnight'.

We tried scraping after 10 minutes, and the Interstrip had eaten away at the first two layers of paint. We found the best tool was in fact a plastic scraper of the type used to apply filler.

Leaving thestripper to work for 10 minutes each time, we got down to the primer after three applications. The Interstrip will leave the primer untouched, ready for the new coat of antifouling.

The tin recommends cleaning up any remaining antifouling with Thinners No3 - which worked but also started to remove the primer underneath. Finally a quick wet sand prepared the surface for the new antifouling.

PBO VERDICT: Quick but messy, and the fastest-acting of all the strippers we tried. Left the primer intact beneath the paint.

RemovALL 620

PRICE: £36.60 for a 3.8 litre tub

Removall is environmentally friendly and safe on your skin. Depending on temperature, you leave it to work for 1-6 hours.

After four hours it had softened the top layer of paint, but nothing underneath, so we applied more and left it overnight. In the morning, the paint had begun to lift, so we scraped it off with a plastic scraper. It took off all the paint down to the primer.

A further application would have revealed the epoxy coating on top of the gel coat. It was viscous enough to not drip when applied.

The instructions say it can be simply blasted off with a pressure- washer. This worked for a few layers, but in our case would have needed another application if we weren't to resort to a scraper.

PBO VERDICT: Slower acting than Interstrip. Environmentally friendly. Left the primer intact beneath the paint.

Marine Strip

PRICE: Available online for £17.95 for a 1 litre pot

Marine Strip is sold in most chandleries. It requires 12 hours at least to eat through antifouling, so we applied it and came back the next day.

When applying, it was viscous enough not to drip. The instructions say to wait until the paint changes colour.

After a few hours, it had darkened and had softened the top layers of paint, but 12 hours later, it was really dark. With a plastic scraper we could then remove all the paint layers down to the primer.

It left the primer dry, which would need wet sanding, or another coat of the stripper, before more paint could be applied over the top.

It came off as easily as the Removall, in soft strips. Like the Removall, it can be pressure-washed off, though this was not as effective as scraping.

PBO VERDICT: Slower working and dried the primer out more than Removall, but the paint came off in bigger sheets.

TIPS FOR CHEMICAL STRIPPING

1. If leaving for extended periods, ie overnight, cover applied areas with cling film to stop the chemical drying out.
2. Wear eye, hand and body protection. Chemical strippers can burn!
3. Use synthetic-bristled brushes
4. Especially where there are many layers of antifouling, you may need a number of applications. Chemicals work better in warmer weather.

3. DIY Soda blasting

PRICE: SODA POT £159.95
£29.95 per bag of soda

COVERAGE: 1sq m per bag

Most people bring in the experts to blast off their old stuff, but one way to keep costs down is by doing it yourself.

Yorkshire-based company Millar Soda Blasting supply soda 'pots' and the accompanying soda which, when coupled with a suitable compressor, lets you do your own blasting.

Company owner Michael Millar made the trip down south to demonstrate the unit. We had a relatively low-powered 13cfm compressor, which meant that the unit's nozzle had to be small. A larger compressor would mean you could use a larger nozzle.

The soda explodes on contact with the hull, removing the paint without damaging the GRP. It ate effortlessly through the layers of paint and primer, leaving the epoxy coating intact, and was by far the least labour-intensive of all the methods we tried.

Using the small nozzle it took Michael five minutes to strip a rectangle 15cm x 25cm. We also tried it on another boat's keel, which was brought back to bright metal quickly and easily, with a residual layer of soda that will protect the metal for up to six weeks. Hard medium can also be added to the soda mix if you need to blast away more than paint.

PBO VERDICT: A slow but easy way to remove antifouling. You could save money by grouping together with fellow boat owners to share a blasting unit. Hiring a large compressor (30-40cfm) would make the job much quicker.

PBO verdict overall

So which is the best of the DIY methods we tried?

Scraping was by far the cheapest and quickest way - but it's labour-intensive, creates lots of dust and you run the risk of scratching the underlying gel coat. The chemical strippers were messy and expensive, but did the job well.

The ability to paint on and leave overnight makes the job of scraping the hull next day far easier than dry scraping. And finally, soda blasting is the least labour-intensive - but was extremely slow. A bigger compressor would sort that out.

It's cheaper than getting someone else to do it - but takes time. If you can afford it, paying someone else to blast it off might not be a bad idea!

Preparing to paint

You may be lucky this year. If your boat's bottom has a half-decent finish, you can postpone the job of removing it till another year - but you will need to key the surface to ensure that the next layer of antifouling sticks to it. Even if you've removed your paint, you still need to key the surface.

A coarse, 40- or 60-grit wet/dry sandpaper used wet to keep dust down should do the trick. Use plenty of water to avoid clogging the sandpaper and, if it's cold, consider using warm water and household washing-up gloves.

Change sandpaper regularly, as soon as it begins to lose its bite.

Barnacle remains need very thorough treatment, as their cement contains a hormone which encourages young barnacle 'spat' to settle nearby. So sand off all this cement until none is left.

If you can organise it, cleaning off the hull like this is actually a job best done soon after the boat comes out of the water. Old antifouling and marine growth is easier to remove before it hardens out of the water over winter - and it saves time in the springtime.

Keels

Once a steel keel has started to corrode and become pitted it can be hard work to restore its smooth finish. The trick is to remove the paint first.

Then you can begin to tackle any rust. Use a wire brush, angle grinder, drill attachment or soda blasting to begin to take the keel finish back to bright metal. Apply a rust converter such as Fertan to get rid of the rust.

Once you've done that, fill any major voids with glassfibre filler paste. It's a slow process.

If there's any damage to the leading edge from grounding, you can build that back up with glassfibre paste, too. Once you've got the keel to an acceptable finish, it's time to prime it with epoxy primer, to seal it, before proceeding to prime and antifoul it.

An area most likely to show signs of corrosion is the keel root. On many boats this is marked by rusty dribbles, although in many cases this is just an irritation rather than being symptomatic of a deeper problem.

To be sure, give the keel a side-to-side wiggle when the boat is in the slings to make sure it isn't moving - if it is, consult a professional to have your keel bolts checked. If, as is most likely, the rust is just cosmetic, you can take the visible bits of keel back to bright metal before priming them with rust-remover.

You can them prime them with epoxy primer to stop any water ingress, before sealing the gap with Sikaflex or another flexible underwater sealant. Before you antifoul, consider a further coat of a tie coat primer like Primocon before you paint on the antifouling.

Propellers and stern gear

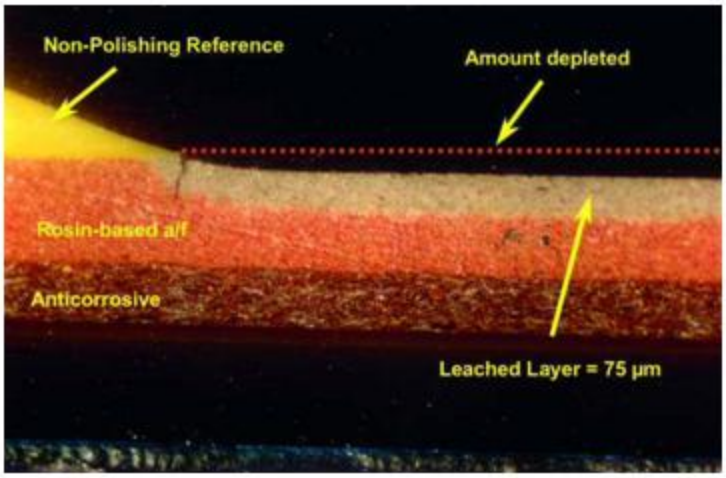
There are a number of options when it comes to stern gear.

Some people like a highly polished finish to the metal so fouling can't get a grip, others prefer to paint it with a hard antifouling or specialist propeller paint, like Seajet's Peller Clean, while some coat it in lanolin or similar grease, such as Propshield or Dr Barnacle.

I'm sending mine off to a machine shop to be polished to a high gloss.

Why bother?

The importance of preparation



This magnified image is a cross-section of a self-eroding antifouling paint.

International Paints' Chris Jones explains: 'The yellow bit on the left hand side is a control section which shows the paint as it is when applied new.'

The gap between the horizontal red dotted line and the pale cream section (leached area) is where the paint has eroded when the boat moves. The leached area is the part of the antifouling film which has lost all its biocide through leaching, but because the boat has not been used enough, the dead paint has not been eroded away.

This area dries outand becomes brittle and unstable. You can see a small crack in the film on the left side next to the yellow section which highlights how brittle the film can become.

The leached area needs to be wet sanded away to go back to the stable biocide-rich remains of the old paint (orange section) before a new season's antifouling is applied on top.

If the wet sanding is not done, it is likely that the old antifouling would flake off on the roller as the new paint is applied or the new paint will fall off underneath the water when the boat goes back in - neither of which are desirable!

Putting on the paint

When choosing your antifouling you'll be presented with a dilemma. You need to find out what will work best on your type of boat and which will be most effective in the area you keep her.

As a starting point, there are three main types of paint to choose between:

- Eroding
- Hard film
- Copper-based

Eroding antifoulings use the water's friction to reduce the thickness of the paint and expose fresh layers of biocide. This erosion releases biocides in a controlled manner, providing a longer and more consistent performance throughout the season. It also helps to reduce long-term build-up of antifouling.

High-speed vessels, boats on drying moorings and racing boats require a **hard film antifouling** rather than an eroding one. This stops the increased pressure on the hull, whether from high speed, silt and mud or scrubbing, from removing the paint film too quickly. These antifoulings work because the biocide leaches out of the paint without the paint film eroding away.

Another variety with a dedicated following is **copper-based** paints. These use particles of copper suspended in an epoxy coating and can last up to 10 years, saving you the annual ritual of antifouling.

Copper-based paints are significantly more expensive than standard antifoulings, but will last a great deal longer. Their application is not covered in this article, but they're worth looking at as a long-term solution to fouling.

Each manufacturer will be able to recommend a paint for your type of boat and level of fouling. For an expert view, you can **download a map of local fouling levels and recommended paints here.**

As a general rule, what is best is a combination of where you are and what you are prepared to pay. The more you pay, the better the results regardless of where you are.

Seajet's Adam Fiander agrees: ‘Seajet's general advice to customers is don't scrimp on the cost of your antifouling and buy the best available product you can afford at the time.'

When it comes to local variations, it's a good idea to to ask around your local sailing community to find out what type of antifouling seems to be working best for your type of boat.

Priming

Whether you've had to remove all the old antifouling or are just putting more on this year, you should consider priming the hull. A tie-coat primer ensures the antifouling will stick properly.

If simply overcoating the existing paint, you'll probably get away without it - but you need to check that the new and old paints won't react with each other. Most modern paints should be compatible with each other.

If you've taken the existing antifouling back to the yacht's gel coat or epoxy coating, it's recommended that you paint the hull with primer to ensure good adhesion. If your existing paint is flaking, you need

to prime any bare or flaky patches. Scrape away until all the flaky paint has come off, then feather the edges by wet sanding them.

Generally speaking, self-eroding antifouling can be safely applied over the top of hard, but applying hard on self-eroding should be avoided.

Specialist racing antifoulings, especially those containing Teflon, are generally incompatible with other coatings - it's worth checking the tin and data-sheets carefully.

If in any doubt, apply a tie-coat of the recommended primer - it's a lot cheaper and quicker than scraping everything off afterwards and having to buy a new tin of paint!

What's in your antifouling?

Antifouling paints are expensive for good reason - they're a complicated formula designed to work in very testing conditions. But what actually goes into them? Here, as an example, is the contents of one popular paint, Micron Extra.

GUM ROSIN A natural product harvested from various species of pine trees around the world, gum rosin is used as a binder when dissolved in solvent. It's soluble inseawater, which allows a controlled release of the biocide mixed with it.

ACRYLIC is used as an insoluble binder when dissolved in solvent. A high acrylic/ low rosin ratio is used in hard, slow-release paints, whereas a low acrylic/ high rosin ratio is used in high eroding paints.

PLASTICISERS are added to increase the flexibility of the paint - gum rosin is a very brittle material, which on its own can cause the paint to crack.

THIXATROPES, normally clay and fumed silica, are added in small quantities to ensure the product does not settle in the tin, to maintain optimum viscosity and to minimise runs and drips. COPPER

OXIDE is a biocide which is effective against both animal and weed fouling.

PREVENTOL A4S is a biocide, effective against weed.

ZINC OXIDE is slowly soluble in seawater which allows it to help control the polishing rate. It also absorbs UV which can attack the sensitive biocides, especially at the waterline.

EXTENDER PIGMENTS, which include talc, China clay, gypsum (plaster of paris) and barium sulphate are used to adjust the binder-to-pigment ratio which in turn affects the paint film properties, such as permeability of water and blistering. Careful selection of the extender pigments is particularly important as their particle size and shape greatly affects their performance.

SOLVENT XYLENE is used to dissolve components of the paint. The evaporation of the solvents causes the paint to dry and form a film.

Putting on the antifouling

After a winter's worth of preparation, the big day arrives - you're finally ready to paint. This is the fun part.

Ideally apply it in the late morning or early afternoon in calm, dry weather to avoid the risk of dampness or overnight dew.

Sometimes you may need to put a plastic sheet down to protect the ground, or wet the surrounding area to prevent dust rising onto your paint surface.

If you're painting on a cold day, keep the tin in a warm place before use, or in a bucket of warm water to help make the paint flow more easily. How much you need to apply varies - but most paints require at least two coats.

1) Using a wide stick, stir the paint well. Biocides are heavy and will sink to the bottom of the tin, so stir vigorously and for longer than you think is probably necessary.

2) It's best not to mix old and new batches of paint in a tin. If you do, use a roller tray, with small amounts at a time. But be warned. One reader writes on our web forum: 'I mixed the contents of my stock pot with a couple of litres of another paint. There was an odd reaction, not unlike a stormy sky, and the stuff seemed to thicken up. Being a cheapskate I applied it to the boat PDQ. It dried looking rather like flock wallpaper.'

3) Pour a small quantity at a time into your roller tray - that way if you drop it you won't lose too much. Replace the lid on the tin, too.

4) Apply the paint in a logical fashion. One PBO reader told us of his way of remembering which bits he'd painted. He drew chalk lines at roughly one foot intervals, which disappeared under the new paint so he always knew where he'd got to.

5) Use a brush for fiddly bits around transducers and stern gear. For a really smooth finish, someone can follow you with a pad to smooth ridges and remove dribbles.

6) If you have enough paint, apply an extra coat along the waterline and leading edges of keels and rudders - all areas that are high wear.

7) Paint around the cradle pads - we'll come to what to do to those later on.

Which roller to use

It's best to use a short mohair or sponge roller suitable for gloss paint. Rollers designed for emulsion will disintegrate very quickly, leaving bits of fluff all over the newly painted surface.

Some people find that smaller radiator-size rollers with long handles are easier to use with such thick paint, but coverage will take longer with these.

How to paint under cradle pads

Painting under the cradle supports is a common problem for boat owners. The time-honoured solution is to paint around the support, then get the yard to move it before painting the bare areas.

If they won't do that, you can slap some paint on while the boat is in the slings - but this won't give you the required two coats or, with most paints, the correct drying time.

I keep my boat on a trailer over the winter and, impatient to get the job done, I chocked the boat up with a hefty fence post, plywood squares and wedges, before gingerly lowering and removing the pad. I painted underneath the pad, ran out of time and wound it back up too soon.

Mistake! When it came to launching, the pad had stuck to the wet paint and left an imprint of itself on the antifouling. This year I'll take my time!

How to paint a boot-top line

A boot-top line really adds to the look of a boat. What's more, it ensures the hull will stay free of fouling and contaminants. If your hull is always stained yellow at the end of the season, consider raising the boot top and antifouling level by a few inches.

You have a number of options when it comes to paint. Some people prefer to use a hard antifouling, like International's Trilux, which will keep the line free from fouling but which, unlike most antifoulings, contains no copper oxide so won't oxidise at the waterline.

Others use standard gloss paint, which looks better when dry and shiny, but will run a greater risk of fouling.

Mask a straight line

We've all seen boats with a wobbly boot-top. The trick to getting it straight is to take your time.

First of all, use a good quality tape to ensure paint doesn't ‘creep' underneath it. Try to get a stepladder or a low scaffolding at a height so the stripe to be masked is at eye level.

Even better, have someone else look along the line while you stick it on. Pull out a long length of tape, and gently lower it to the hull while looking along it. This will give you a much fairer, even line than if you stick it down at short intervals.

Stand back every now and again to check. When you get to the bow, use a number of pieces of tape to keep the line straight and level as it goes around the curve.

TIPS FOR PAINTING

1. Keep a rag and some thinners handy for the inevitable splashes and drips. That way you can remove them easily and quickly.
2. As soon as the final coat feels tacky, remove the masking tape. It will be difficult to get off later on. Dispose of it quickly unless you want it to make fancy patterns on your topsides as it blows in the wind.
3. Don't apply the antifouling too vigorously or try to stretch it too far - if you do that you will run the risk of disturbing the primer below.

And finally, sail more!

Unfortunately, no antifouling is going to keep your boat completely slime free. But the more you use your boat, the better the antifouling works, as International Paint's Richard Jerram reminds us:

'Antifouling paint always works best when the boat is well used as they are developed to work when in motion. So if you want a completely clean hull then choose the most appropriate antifouling and get out onto the water. Do you really need an excuse?'

This article was published in the April 2011 issue of Practical Boat Owner magazine. See PBO's November 2014 issue for our latest antifouling article 'Antifouling: should we bother?'

Back to top