

DIY APPLICATION OF ANTIFOULING PAINTS

Guidance on how to prepare the boat hull, apply antifouling paints safely, and best practice for cleaning up and waste disposal



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PURPOSE AND TARGET AUDIENCE

This document for boat-owners, part of our DIY Safe Antifouling Initiative 2017 for the leisure boat sector, provides comprehensive guidance on all aspects related to antifouling boats by DIY painting. The hazardous nature of these paints is emphasized, along with the precautions that should be taken when handling and applying antifouling, and the best practice to follow when preparing the boat hull, applying the paint and disposing of the waste. The correct use of Personal Protective Equipment (PPE) is highlighted, to ensure that DIY antifouling paint users protect their health and follow safe use practice for these specialist paints. Recommendations on hull preparation (especially the capture of old scrapings) and waste disposal are also provided, in order to ensure minimum impact on the environment.

This document is intended as a main reference document for boat-owners who antifoul their own boats, so is freely provided by the British Coatings Federation (BCF), both in hard copy through antifouling paint manufacturers and sales outlets, as well as through the website **www.safeantifouling.com**.

2 BACKGROUND

Ensuring the safe use of antifouling paints in a DIY / boat-owner scenario continues to be a major focus for antifouling paint manufacturers, especially since the introduction of the EU's Biocidal Product Regulation in 2012 (BPR, Regulation 528 / 2012). A restricted number of the 'active' substances (chemicals with biocidal activity, which stop marine organisms from attaching themselves to the hull) used in antifouling paints have proceeded through the BPR approval process and now the paint manufacturers have to apply for approval for the finished paints based on these substances. An important part of this approval process is the assessment of risk to human health from the paints themselves, and the correct procedures that should be followed by boat owners when applying them.





The BCF ran a survey in the Autumn of 2015 to determine the extent to which regular DIY users of antifouling paint protect themselves through the use of PPE. The output and conclusions from this survey may be found in the BCF March 2016 publication – Technical Bulletin #1 – 'Antifouling paints – ensuring safe use by boat owners in the UK', which may be obtained through the weblink – **www.safeantifouling.com**. There was an excellent response to this survey (over 2400 replies), and many positive conclusions relating to the existing level of awareness of the hazards of antifouling paints, as well as the standard use of PPE to minimise exposure. However, a need for further education and specific guidance was identified, hence the publication of this document, along with a poster (Annex 1), a tri-fold point-of-sale leaflet (Annex 2) and a video.

The Leisure Boat sector's DIY Safe Antifouling Initiative 2017, led by the BCF, is supported by British Marine and the Royal Yachting Association. Our thanks go to these organisations, as well as to Broad Reach Communications, for their assistance with the preparation of all the tools and materials associated with the initiative.

DO



DO NOT

- **Eat, drink or smoke** whilst working on the project
- **Allow bystanders** to come close to the area of activity
- **X** Use dry abrasive paper or dust-creating techniques to remove old antifouling paint
- Create dry paint dust during the whole process
- **Create paint fumes** by using blow lamps or gas torches to strip the paint
- **Remove PPE** before the job has been completed
- **Spray apply antifouling paint –** this should only be done by professionals
- **X** Use solvents or thinners to wash paint splashes from skin, use warm soapy water & specialist cleaners
- X Pour waste antifouling paint down the drain

THE HAZARDS ASSOCIATED WITH ANTIFOULING PAINTS

Generally, antifouling paints contain solvents and specific hazardous chemicals (biocides), the latter giving the coating its antifouling properties. They are essential for the paint to perform, by:

- controlling the marine organisms that come into extended contact with the dry paint film, thus preventing a build-up of 'fouling'
- preventing a transfer of invasive species from one location to another
- minimising drag, to ensure fuel-efficient journeys

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Specific product information on the paint selected by the user should be consulted at the outset of any antifouling project – this should be available at the sales outlet from which the product was purchased, or directly from the manufacturer of the antifouling paint. Basic information will be displayed on the product label on the paint can, more detailed information may be found on the manufacturer's safety data sheet. Also, many antifouling paint manufacturers supplying in the UK provide a detailed manual to customers with information on the appropriate precautions that need to be taken by users.



The specific hazards for an antifouling paint will depend on its composition, including the actual biocide(s) used and their concentration level (and possibly other components in the paint) so the information contained in this document should be considered only as generic guidance.

There are four key hazard-related concerns with regard to the use of antifouling paints:

- **contact with the skin,** which could result in dermatitis
- contact with the eyes, which could result in long-term eye damage
- **inhalation** of antifouling paint fumes or dust
- **ingestion** of antifouling paint (liquid or dried film)

Any bystanders should be kept well away from the activity throughout the whole project

i) Skin contact

Many of the biocides used in antifouling paints are skin sensitisers. This means that certain people may show a reaction to contact with a paint containing the biocide. This reaction may be just a slight or mild irritation, itching or soreness, with a drying and redness / inflammation of the contacted area, or it may be more severe dermatitis or clinical sensitisation. The latter is of specific concern, as it could lead to more permanent health issues related to skin sensitivity and how the person's skin reacts to other chemical substances.

The main approach to controlling these risks is to use the correct PPE (coveralls / overalls and the correct gloves) and to immediately wash off any paint that comes into contact with the skin with warm soapy water. Solvents or paint thinners must not be used to clean skin, however there are also specialist skin cleansers and wipes (such as Swarfega) available. Barrier creams applied prior to starting the painting can also help reduce the possibility of contracting dermatitis, as can the application of skin conditioners and moisturisers after washing.

ii) Eye contact

Several of the components in antifouling paints could cause eye irritation and conjunctivitis, which would need professional medical treatment and advice. The use of protective safety goggles or glasses is an essential part of the PPE kit for the DIY applicator, especially as often the painting will be done from below the boat, looking upwards as the paint is being applied. If any antifouling paint materials come into contact with eyes then the person affected must rinse the eyes immediately with copious amounts of clean fresh water for at least 15 minutes holding the eyelids apart, and to then seek medical advice.

iii) Inhalation of paint dust or fumes

Whilst preparing the boat hull, as with preparing any unknown painted surface, it is important that exposure to old paint dust or paint fumes is kept to a minimum. This is why wet abrasion and the use of appropriate paint removers are the only recommended methods for preparing the boat hull. Do not dry abrade or use heating methods / torches to remove the paint films. Also, it is important to try to avoid inhaling the solvent fumes, especially when first opening and stirring the antifouling paint. Symptoms of respiratory sensitisation as a result of inhaling antifouling paint dust or fumes include a dry cough, shortness of breath and asthma.

This can become a permanent health issue for persons affected – once someone is sensitised then only a small amount of the chemical substance, or other similar substances, could trigger a reaction which may have significant consequences. Dust masks must be used during the surface preparation stage to minimise exposure, and during the cleaning-up stage.

iv) Swallowing paint

Antifouling paints contain a number of substances that could cause considerable adverse reactions if swallowed. Painters must not eat or drink whilst carrying out antifouling projects, and care must be taken to ensure that bystanders, especially children, are kept well away from the activity and do not inadvertently eat either food contaminated with flakes of paint, or drink the liquid paint. If someone does accidentally swallow any quantity of antifouling paint then seek medical advice **immediately**. Keep the patient at rest and do not induce vomiting.

If you think that your health, or that of anyone else, may have been affected by exposure to antifouling paint or dust then you should contact your local doctor immediately or call the relevant NHS non-emergency helplines on:



Please be prepared to have the antifouling paint product details to-hand when calling these numbers (preferably with the product and safety data sheets also available for reference).

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Do not start any project without having the correct quality and type of PPE available.

The selection and use of PPE is an essential part of any antifouling project. Advice on PPE may be sought from the manufacturers of the PPE, the sales outlets that supply antifouling paint (e.g. the chandlers and through the internet), and from the antifouling paint manufacturers, through their literature and websites.

The following PPE must be used during the antifouling process

i) Throughout the whole antifouling procedure, from beginning to end



ii) Additionally, during the boat hull preparation and during the cleaning-up process



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WEAR A DUST MASK

iii) When using solvent-based antifouling paint



In addition, proper working boots, safety shoes or wellingtons should be worn. The head and hair should be covered during antifouling to prevent splashes on the skin, so a cap or hat may be preferred to using the hood of the overalls.

Selecting PPE

Further information on the correct and appropriate use of PPE may be found through the following HSE website link – http://www.hse.gov.uk/toolbox/ppe.htm

Overalls / Coveralls – these should be the correct size for the user, single use, anti-static and made from a blend of cotton and synthetic materials, or materials that have sufficient protection so that antifouling paint cannot easily penetrate and soak through to the clothing underneath. They should be full length to fully cover arms and legs, and with a hood. Further guidance on overall selection may be found by contacting the overall suppliers.

Goggles / Safety Glasses – Goggles are preferred over safety glasses, although either may be used. Take special care to select comfortable good-fitting models which may be used for long periods of time. Ensure that the lenses are clean and in good condition prior to starting any antifouling activity.



Gloves and skin protection – these should be made of a suitable solvent-resistant material – the correct recommended type is a nitrile category 3 chemical resistant glove. They need to be single use / disposable gloves with full length protection (over the wrists, so that they overlap the overall sleeves). Special care should be taken with regard to gloves as they can easily become contaminated on the inside. Advice should be sought from the glove suppliers on purchasing the appropriate type, and from chandlers and marine supply shops. Outlets selling antifouling paint should have the correct gloves readily available for purchase. Thin plastic disposable gloves for general / standard hygiene use must not be used, as it is highly likely that the solvent-based paint could penetrate the plastic and reach the skin. Barrier creams and the use of general disposable plastic gloves do not provide a full barrier and are not alternatives to properly selected gloves. Do not use petroleum jelly as this can help paint absorption through the skin.

Dust masks – should be worn throughout the preparation stage and the cleaning and disposal process, when dust inhalation is possible. Wet abrasion is recommended so dust levels should be minimal, but the use of a dust mask will prevent the inhalation of the old antifouling debris.

Respiratory protection – should be worn when using solvent-based antifouling paints. It is recommended to wear a mask such as a cartridge respirator e.g. with a carbon filter with an assigned protection factor (APF) 10, especially if you intend to antifoul in any confined location with limited airflow (i.e. not in the open air).

Please Note:

- If any PPE becomes very heavily contaminated during the antifouling activity then it is recommended to carefully replace this immediately with new PPE.
- Overalls and gloves should only be removed once the final stages of clean-up have been completed. Make sure that you do not contaminate skin or clothing as you remove them.
- Apart from the safety glasses / goggles, all the PPE should be safely disposed of on completion of the antifouling project. It is not recommended to clean and re-use overalls, dust masks or gloves.
- Particular care must be taken when disposing of contaminated PPE, which must be done as instructed in section 8.

i) Selecting the correct antifouling paint

It is important to select the correct type of antifouling paint for your vessel, to protect it for the normal conditions that it will encounter. In addition to the local boatyard or marina, several organisations and publications are able to provide advice on local fouling levels and what is required, including The GreenBlue **www.thegreenblue.org.uk** and Practical Boat Owner **www.pbo.co.uk**. Please contact the paint manufacturer and appropriate marine-related organisations to determine which paint is most suited to your boat type and your environment. In addition to traditional antifouling paints there are also some new types of paints available that prevent fouling, usually called 'fouling release' coatings. These coatings work by creating a very smooth non-stick surface to the hull of a boat. Again, the paint manufacturers will be able to provide further information and details, and full recommendations on how to use these products safely.

In most cases, boat-owners will be applying fresh antifouling over an existing uniform paint surface, that will only require minor preparation (wet sanding and cleaning) before painting. Stripping a boat hull back and removing all the existing antifouling paint is usually only necessary if:

- **you intend to switch** to a significantly different type of antifouling paint (there are several different distinct antifouling paint technologies available on the market).
- **you are unsure** what the existing antifouling treatment is (because you have acquired the boat recently).
- **you have an existing coating** that is known to cause compatibility issues with standard antifouling paints (e.g. a Teflon-based coating).

If you are changing to a different make or type of antifouling paint then there may be compatibility problems between the new paint and the existing surface. Please consult the manufacturer's specific advice in their literature before deciding which antifouling paint to purchase and what actions to take regarding preparation. Barrier coats and tie coats are available to apply over the existing surface, if there are concerns over compatibility, which should then allow application of a fresh antifouling paint without issue. If your boat has an alloy hull then do not use a standard copperbased antifouling product – seek advice from the antifouling paint manufacturers as to what should be used instead.

ii) Selecting a safe location to antifoul

When carrying out an antifouling project a fundamental consideration is to ensure minimum impact on the health and safety of the applicator and any people nearby, and to focus on protecting the environment. Only antifoul in a safe and secure location outdoors, preferably in a boatyard or marina, and in favourable weather conditions. Do not antifoul your boat in public places (e.g. car parks) as you have no control over the activities of other members of the public, nor the ability to keep waste and debris contained.

The legislation covering the use of the biocidal products that are in antifouling paints explicitly states that a safe location must be used. In future, labels on antifouling paints will contain the following text, or similar, to emphasize the importance of this aspect –

"...application, maintenance and repair activities shall be conducted within a contained area to prevent losses and minimize emissions to the environment. This means that activities must take place on an impermeable hard standing with bunding or on soil covered with an impermeable material. Any losses or waste containing antifouling biocides shall be collected for reuse or disposal."

iii) Preparing the boat hull

REMEMBER

- **Keep bystanders away.**
- Only antifoul in favourable (dry and only light winds) weather conditions.
- All washings, scrapings, slurries and residues are to be treated as hazardous waste and need to be retained for later disposal.

Before starting the preparation stage, make sure that you are wearing the appropriate PPE as listed in section 5 above, and that the area where you are working is safe, secure and suitable for carrying out the task. Ensure that you have sufficient paint, water and the correct utensils to complete the task. Also, make sure that bystanders are kept well away from your activity, preferably with some form of cordoning off of the area.

Washing and cleaning the boat hull

Once the boat has been removed from the water it should first be jet-washed to remove any marine growth or contamination. These washings should be captured and retained for treatment, as they will likely have a significant concentration of the existing anti-fouling treatment – washings and debris from the boat preparation should not be allowed to directly enter watercourses. The marina or boatyard should have facilities for such an operation (e.g. a bunded catchment area). Additional cleaning of the hull may be required subsequent to the jet-washing – household detergents or degreasers may be used, as well as specialist products supplied specifically for cleaning boat hulls. Once again, all of the washing and residues arising from this cleaning procedure should be captured and treated as instructed by the marina / boatyard.

Removing old paint

Once the hull is clean from all traces of contamination, treatment of the surface and what remains of the existing antifouling layer may begin. The first step is to place a dust sheet or tarpaulin underneath the boat, to capture the paint flakes and scraping residues. It is also important to ensure that you are working in safe weather conditions (dry not damp, light or no wind). Dust should not be allowed to be blown outside of your working area, contaminating other vessels or people. All loose and flaking paint must first be removed using a paint scraper and wet abrasion. Triangular shaped scrapers and special-bladed (e.g. tungsten-carbide) scrapers are preferred. Coarse 40- or 60-grit wet / dry sandpaper is normally used for rubbing down, with plenty of water to keep the debris wet.

There are also gelcoat-friendly specialty antifouling removers on the market, which can be applied and then left to penetrate just the antifouling layers of the boat hull. These are particularly useful if there are several successive layers of antifoul already on the boat that need removing. Note however that there are significant differences in their degree of effectiveness, environmental performance and mode of action – some require only minutes to act, others may have the recommendation to be left for ten hours or more. Ensure that the manufacturer's instructions are followed. Plastic scrapers are usually used to then remove the chemically stripped antifouling layers. Do not use standard paint removers as these may penetrate down to the gelcoat, or to the primer, and damage them.

Damage repair

If you damage the primer protective coat then seek advice from the paint manufacturers with regard to how to repair this. Similarly, if there are damaged areas and cracks that require a filler then please seek advice from the suppliers and use the correct type of filler compound (an epoxy-based filler is usually recommended). Barrier and primer coatings are then applied as required – patch priming is often needed for certain areas on the hull. Allow all coatings and fillers to fully dry before the final stage of hull preparation - a wash and wipe down of the surface with e.g. specialist cleaners (available from the paint manufacturers) and tack rags.

Treating underwater steel components

If there are steel components intended to be under the water surface (e.g. steel keels) then these should be treated in accordance with the marina / boatyard instructions. To maintain these areas as rust-free will normally require shot blasting followed by the application of several coats of a specific protective paint for the purpose. Note the specific guidance with regard to the application of paint systems over shot-blast steel, especially with regard to the problem of moisture retention in the steel (which will cause paint adhesion failure), and the drying time that is needed for each application of paint, as several layers of paint will need to be applied.

7 APPLYING THE ANTIFOULING PAINT

REMEMBER

- Keep bystanders away.
- Only antifoul in favourable (dry, no dew, only light winds) weather conditions.
- Put on PPE (overalls, goggles and gloves) before starting to apply antifouling paint.

First, mask the area that you intend to antifoul with the appropriate tape. Some tapes can cause problems during removal, so it is preferable to select the best tape for the job rather than standard paper masking tape. Please remember to mask off any zinc anodes – these will no longer work if coated with antifouling paint. Also, please note that transducers should only be painted with water-based antifouling paint, as solvent-based paint will damage the transducer surface and weaken the signal.

Ensure that the equipment (brushes or rollers, paint tray etc.) are suitable for using with antifouling paint – especially that the paint tray is resistant to the paint that you intend to apply (some plastic trays are not solvent resistant, for example and are only intended for wall paints). Ensure that you continue to wear all the PPE throughout the application process. If your PPE becomes heavily contaminated, or the paint appears to be penetrating through the overalls or gloves then carefully remove and replace with fresh protection. If you contaminate rags with paint then do not leave them lying around or put them in your overall pockets – these are fire hazards and could auto-ignite if allowed to dry. Keep them wet and then dispose of safely as instructed by the boatyard.



The antifouling paint purchased should normally be ready-for-use, so no thinning or adjustment to the paint should be needed prior to normal application. However, antifouling paint in cold weather may be too thick to apply to achieve a good finish so addition of thinners (in accordance with the paint manufacturer's specific instructions) may be necessary. Keep lids closed on the paint cans when not in use to avoid contamination or possible spillage. Store all paint in a well-ventilated dry place away from sources of heat and direct sunlight, and well away from naked flames, as antifouling paints will usually contain flammable solvents and create solvent fumes. Do not transfer antifouling paint to a different can or container, only use it from the original can or from the designated paint tray. If the antifouling paint is stored indoors or kept in the car prior to the work then it will be closer to room temperature and therefore easier to apply. A bucket of warm water may also be used to bring the temperature of the paint up to optimise workability.

The paint will first need to be stirred well with a suitable paint stirrer e.g. a clean flat-bladed metal or wooden instrument, as the active pigments and solid components in the paint will settle to the bottom on storage. Apply the paint according to the manufacturer's instructions provided with the product, allowing the correct drying time between coats, to ensure good adhesion and coverage of the surface. Paints may require two or perhaps three coats. It is recommended to apply extra coats along the high wear areas of the boat, such as the waterline and leading edges of the keel and rudder, according to the manufacturer's instructions.



Once the painting has been completed the paint should be allowed to dry and harden as per the manufacturer's instructions before the boat is returned to the water. Once the final coat of paint feels tacky then remove the masking tape to avoid it becoming more permanently stuck to the hull.

Splashes and Spills

The PPE should prevent any direct contact of your skin with the antifouling paint. If any paint does splash onto skin then immediately wash this off with warm soapy water. **Do not use solvent or paint thinners to remove antifouling paint from skin**, as these can drive the paint into the pores of the skin and hence into your body and cause damage. They will also remove the surface protective fatty layer of the skin and will cause it to dry out and hence be less protected from the paint. There are certain specialised cleaning solutions (water-detergent mixes and gritty creams such as Swarfega) available that may be used to remove paint splashes – follow the manufacturer's instructions if you decide to use these.

Paint spillages should be contained and collected with non-combustible absorbent materials, e.g. sand, earth, vermiculite or diatomaceous earth. This mix must then be disposed of as hazardous waste – **see section 8**.

8 CLEANING UP AND WASTE DISPOSAL

It is essential that the best practice check-list approach to cleaning up after completing the task of applying antifouling paint is followed:



I. CONTINUE to wear PPE until clean-up and disposal is complete.

2. CLEAN OFF excess paint from utensils using warm soapy water and retain washings.

3. DO NOT leave rags soaked in paint lying around, in bins or in overall pockets – these are fire hazards, especially if allowed to dry (they can auto-ignite).

4. DO NOT pour waste antifouling paint down the drain – this should be stored in a specified area on the site ready for collection by professional hazardous waste contractors.

5. DO NOT take any contaminated equipment or PPE off-site – it is especially important not to put any half-used tins of paint or contaminated equipment into your car as the fumes will affect your health and ability to drive. Treat all the equipment, opened cans and tools as hazardous waste.

6. COLLECT the different sources of hazardous waste into one area -

- Empty paint cans
- Used brushes, rollers and trays
- Paint rags and contaminated textiles
- Masking tape
- Paint flakes and residues from the preparation process
- Contaminated PPE
- Waste paint
- Any items splashed with paint

7. DISPOSE of all hazardous waste as instructed by the marina / boat-yard

ANNEX I

Poster - 'Antifouling Your Own Boat?'



ANNEX 2

Point-of-Sale Tri-fold Leaflet



The British Coatings Federation (BCF) is the sole UK Trade Association representing the interests of the decorative, industrial and powder coatings, printing inks and wallcovering industries. Founded in 1912 as The National Federation of Associated Paint, Colour and Varnish Manufacturers of the United Kingdom, the BCF has 130 manufacturing members representing more than 90% of the UK paint and coatings market, and 60 associate members (suppliers to the industry). Manufacturers come from a wide range of small-and medium- sized enterprises as well as large multi-nationals, with the greatest concentration of member companies based in the North-West of England.

The BCF's prime aims are to promote and to protect the interests of its members, to encourage the prosperity of the industry, to improve the business climate in which the industry operates and to provide an interface between the industry and the government, other industry and non-industry organisations, the media and the general public.

The coatings industry supplies the construction, home improvement, printing, automotive, aerospace and other advanced manufacturing sectors worth over £188 billion to UK plc. 300,000 people are directly involved in manufacturing, applying or using coatings. Three out of every four cans of paint sold in the UK are made in the UK, and 30% of UK production is exported, making the UK a net exporter of paint. Three in five paint companies export, which is well above the average of one in five UK companies at present.



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