Guide to Antifouling

There are a number of important factors to take into consideration when choosing the right antifouling for your boat. The paint should be customised to the fouling conditions found in the area you keep and sail your boat. These conditions depend upon a number of issues such as geographic location, mooring situation and of course the type of vessel to be antifouled. However there are also environmental conditions to be aware of, such as varying water qualities and temperatures, as these can result in different types of fouling inhabiting an area. Within a small area differences in fouling can be considerable due to factors such as the speed of flow of water, pollution, outfalls from industry and pollution as well as unexpected influences such as shading from buildings and trees.

Types of Fouling

Slime – This is caused by billions of singled celled algae, which produce slime as a safe medium to settle and develop in. Once an initial population of algae is established a suitable environment has been set up for more algae settle. As a result thick layers of slime can build up relatively quickly as the boat moving through the water is not enough to dislodge the slime.

Weed - When a boat is static in the water it attracts seaweeds to settle. The majority of these weeds are removed as soon as the vessel starts to make way through the water. However there are certain types of weed that take a strong enough hold to withstand the boat movement through the water.

Fouling animals e.g. Barnacles – These small creatures release millions of minute larvae into the water, all of which need to land on and attach to a static object to allow them to feed. Most boats when static provide a perfect feeding ground for these larvae to establish a strong hold.

The Antifouling Paints

Contents – The majority of antifouling paints produced are copper-based, in which the main biocide is cuprous oxide, the natural form of copper. The paints also contain other biocides in smaller quantities, know as booster biocides, and these include Zinc Pyrithione, Dichlofluanid and Zineb. There are also a variety of paints that are made up with a biocide called cuprous thiocyanate, which contains a less potent form of copper and these can be referred to as 'copper free' paints. However, cuprous thiocyanate-based antifouling paints are generally not as effective or long lasting as the copper-based biocides.

The biocide used is always displayed on the label of the tin and in the technical information associated with the paint.

Soft / Traditional Paints – These paints have generally been outdated by the newly developed paint technologies that have become available in recent years. The active ingredient, or biocide, within these paints is predominantly Cuprous Oxide and this is suspended within the paint matrix. This format allows it to leach out over time, along with the binder, leaving a honeycomb like coating that needs to be removed once every few years.

Erodible/ Self-Polishing Paints- These are the most widely used type of antifouling paints amongst recreational boat owners. They work through the process of ***ablation,*** which involves the controlled wearing of the antifouling coating. As the layer of paint adjacent to the water dissolves, it removes any organisms that may be clinging to the hull, exposing a fresh layer of biocide to combat the further fouling that will occur. However, the surface of this paint layer is unstable so it is difficult for organisms to establish a firm hold on the surface of the hull and consequently less biocide is needed within the paint matrix to produce the required affect. This process leads to most of the initially applied paint to be washed away as the boat is used throughout the season, resulting in far less build up over the years and less work for the owner when it comes to reapplying antifouling.

Hard Paints –These antifoulants contain high levels of insoluble resin, producing a paint matrix that does not erode on contact with water. The process by which these paints work is known as ***contact leaching***. The active ingredients within the paint resin are soluble and are packed in such a way that as each particle of biocide is in direct contact with another. This format means that once one particle is dissolved, the adjacent particle behind it then becomes exposed to the surrounding water.

Teflon – This is one of the most slippery materials available. The non-wetting properties of Teflon have lead to its widespread use in various water repellent materials such as Gore-Tex as well as in coating for easy clean surfaces. As a component of an antifouling paint, once applied it creates a smooth, low friction topcoat on the hull that acts to reduce drag and therefore improve performance. Teflon antifouling is unique, but acts as a hard antifouling as application results in a hard coating that is resistant to damage and is easily cleaned.

When Choosing an Antifouling Paint

The Vessel – There are some key points to note when it comes to applying an antifouling paint to the hull of your boat. These are the hull substrate, the boat type and the speed at which the boat will be travelling.

Hull Substrate:

- Aluminium - Copper based products must never be used on hulls, outdrives and propellers which are made of aluminium. This is because, when immersed in water the copper in the paint and the aluminium react to cause electrolysis, which in turn corrodes the aluminium on which the paint is applied. While no products containing cuprous oxide can be used on aluminium, products containing the biocide copper thiocyanate can be used on the assumption that primer layer has been applied first.
- Steel – If the new antifouling layer is ***not*** being added to over coat an existing antifoulant then a primer will need to be applied first to protect the hull substrate.

Boat Type/Speed:

- The majority of erodible paint manufacturers advise that their paint products of this type are suitable for boats travelling up to 25 knots. At 25 knots erodible paints become less effective at these speeds the paint layers can be worn away at an accelerated rate due to water abrasion. This may not be a problem for a vessel that is used at this speed on an irregular basis, but would not be suitable for a vessel such a motor cruiser doing over 25 knots on a regular basis.
- Hard antifouling, due to the fact it is resistant to abrasion, is ideal for high speed power boats, boats travelling above 25 knots and in rough seas regularly and also for racing yachts where a smooth hull can be achieved by polishing the antifouling with wet abrasive paper before the boats launch when required.

Geographical Location - Geographical location can play a major part in the type of fouling that can be present and therefore will influence the type of antifouling paint to be chosen.

Coastal / Saline water:

- The fouling prevention in coastal waters has to combat not only slime and weed but also animals such as barnacles, which can cause a considerable amount of damage if not dealt with and prevented. Coastal waters are subject to run off from industry, agriculture and in put form vessels emptying tanks at sea, which all act as feeders for fouling organisms. The tide also moves the water on a regular basis bringing more fouling with it at specific times if year.

Inland / Freshwater:

- There are alternative fouling problems found on inland freshwaters. The predominant fouling is identified as slime and fresh water weed, rather than animals such as barnacles. The waters are still or slow flowing, increasing the concentration of organisms in the water

searching for a suitable surface to settle upon. These waters are also subject to agricultural run off, increasing the phosphate levels, acting as a fertilizer for fouling. Another issue is whether the water is hard or soft. There are reported problems of lime scale fouling in areas with very hard water. There are products that are made specifically for fresh waters, which are formulated to combat the unique problems found inland.

- Whether your boat is kept in the cool waters or in warmer waters, temperature has a significant affect on both the fouling present and the way antifouling paints work. For instance, paints designed for cold-water environment will not work in areas where the water temperature rises considerably during summer months. Here, more tropical fouling paints may be considered. However in lakes and rivers, where the water is deep and fresh, typical biocides do not work effectively and an inland alternative should be applied to the hull.

Mooring Situation

Dry Sail:

- When regularly taking the boat out of the water once a season antifouling has been applied can lead to the paint to degrade, whether it is hard, soft or erodible paint. All antifouling paint has a set maximum the boat can be out of the water after re-painting before it should be launched to preserve the newly applied paint. For the majority of paints the manufactures state a 3 month limit. Antifoul is a complex paint and once launched and recovered antifoul can start to degrade quite rapidly, to the point that performance can be significantly impacted just a week after being ashore. The advice given to boat owners if the boat has to be out of the water and it is not being worked on, is to regularly wet the hull with salt water, which will keep it damp and mitigate the effect of ultra violet light on the paint particles.

Drying Moorings:

- A hard antifouling is advised if your boat is moored at a location that dries out each low tide. Due to the nature of hard antifouling, it is resistant to abrasion and therefore is ideal for boats that are exposed to the mud, light and air for parts of the tidal cycle each day.

Deep Water Moorings:

- In this situation the hull is permanently submersed in the water, whether it is fresh or saline. Factors to consider in this case is whether the water is flowing and at what pace e.g.: tidal or river.

The Quantity of Paint needed

Always use the recommended amount of antifouling paint as stated by the manufacturer. Under application reduces the efficiency of the paint and can result in premature fouling and increases the potential for a mid season haul out and re-paint.

The majority of products give guidelines on how much paint will be needed in metres squared/litre (m^2/lt). However, many boat owners only know the dimensions of their vessel by length, beam and draught, not metres squared. To resolve this there is an easy and generic way to calculate the size of a craft in metres squared and this stated below: -

- Motor Yachts, Straight Long Keeled Sailing Yachts and Shallow Draught Sailing Yachts:
  0.85 Length Waterline (m) X (Beam (m) + Draught (m)) = Square Metres

- Bilge Keel Yachts:
  0.75 X Length Waterline (m) X (Beam (m) + Draught (m)) = Square Metres

- Fin Keeled Racing Craft with Short Keels:
  0.50 X Length Waterline (m) X (Beam (m) + Draught (m)) = Square Metres

- Catamarans:

4 X Length Waterline (m) X Draught (m) = Square Metres

Preparing to Paint

There are many issues to consider when applying the antifouling and preparing the surface for it to be painted upon. This section pre-empts some questions you may have and gives some helpful tips as to how to prepare the boat for painting.

No Previous Antifouling – If there has not been any antifouling applied to the hull before the surface will need to be sanded down with wet-and-dry paper. Following this one coat of underwater primer will need to be added.

Painting over Old Antifouling – Most European antifouling paints are chemically compatible with one another and can be overcoated easily. However there are some basic rules that should be followed when over coating old antifouling:

- **Do not dry sand old antifouling, as the dust is toxic.**
- The surface area of the hull that is to be painted must be prepared correctly so it is free of contaminates and in a sound condition.
- Hard antifouling paints leave an exhausted layer of resin at the end of the season. This layer cannot be overcoated without some prior preparation. Therefore the old antifouling should be wet abraded before applying a new coat onto it.
- A Teflon antifouling can be overcoated with very little prior preparation as long as the original coating is in good condition and has been washed thoroughly – **Do Not** abrade the surface prior to applying new antifouling.
- A soft antifouling should be sealed with underwater primer before applying an erodible or hard antifouling to the top of it.

Painting over unknown antifouling – Most antifouling are chemically compatible and can be overcoated with no detrimental affects. However:

- If you are concerned, try a sample of the new antifoulant on a small area of the hull before starting the application process. Make sure that this sample area will not be visible once the boat is in the water.
- It is unwise to apply a hard antifouling paint straight onto an erodible antifouling. Ideally total removal of the erodible layer should be considered for the best results. An alternative is to allow the erodible paint to deplete with use and then apply a sealer coat of underwater primer before applying any further antifouling.
- If you prefer you can remove all the old antifouling to start again. Once you have stripped your hull it is ideal opportunity to check for any gelcoat damage before repainting.

Timing – As with any painting project, timing is important on a number of scales as listed below:

- Season: Antifouling products give a time span in which the paint will work effectively before more antifoulant needs reapplying. This time span can range from a single season, classed as March to October, to a full year or more. Recreational boat owners generally use products that last up to a year and it is the commercial market that look for antifouling that lasts longer, such as products that can be left for up to 6 years.

- Launch time: It is important to note before you start the minimum and maximum time the boat should be left out of the water before it is re-launched following an application on antifouling paint. The general maximum time given is 3 months and this is to prevent the antifouling from degrading and not performing adequately once immersed. The minimum time can be as little as 24 hours, and this is to ensure the paint has set and bonded to the hull sufficiently.

- Between Coats: It is important to check the minimum time advised between applying coats. The information given with the paints give times to follow according to the temperature you are applying the paint in. If a second coat is attempted too early it can ruin the original layer.

The Painting Process

Conditions – However keen you are to get your antifouling done do not attempt to start on a wet or damp day. Choose a dry day for painting as moisture in the air can affect the bonding properties of the paint. Also keep the antifouling paint to be applied indoors until the time comes to use it. The paint will be easier to apply, as it is more malleable at room temperature.

Clothing – Information on the protective clothing and eyewear recommended by the paint manufacturer will be available with the paint and in the technical information.

Utensils– The most common application methods are roller and paint brush. Spray application can be used but this requires a specialist to apply the paint. When using a roller, choose the **short mohair** type, which is ideal for this kind of work. The finish found with antifouling is not as smooth as that of topside paint so if a paintbrush is used it really does not matter what type it is. However, it is advised to use a **large width** brush, about 5 inches wide.

Painting - There are some key points to remember when painting with antifoul:

- Work the paintbrush or roller in a cross-cross pattern and do not spread the paint too thinly.
- It is vital to apply the correct thickness of antifouling so the paint works efficiently, even if it requires you to apply an extra coat.
- It is important to remember that everyone will have a different painting technique so make sure that all the paint you have calculated to use is applied evenly.
- For the majority of antifouling paints the required thickness stated by the manufacturer is achieved with **two coats**.
- There are certain areas of a boat that are subject to high levels of turbulence and here a further coat will be needed to maintain a suitable thickness of antifoulant. These areas include **all leading and trailing edges, the waterline, outdrives, the keel, the rudder**.
- Antifouling paints contain heavy pigments that settle at the bottom of the tin when left still for a while. It is important to keep stirring the paint, particularly when using a roller tray.
- Use a good quality masking tape to identify the waterline. A poor quality tape can allow paint to seep underneath and not peel off easily, resulting in a messy finish along the waterline.

Thinners - Antifouling does not always need thinning and it should be used with extreme care if it is required. Be sure to use only the exact thinner recommended by the manufacturer as antifouling paints are complex mixtures and a thinner can destroy the chemical properties leading to poor performance. However, in particularly **cold** conditions thinning the antifouling by 10% may make application easier.

Antifouling Paints on the Market

- **International Paint Ltd**
  - CRUISER UNO
  - INTERSPEED AQUA
  - INTERSPEED ULTRA
  - MICRON 55
  - MICRON 66
  - MICRON OPTIMA
  - NAUTICAL ERODING ANTIFOULING
  - NEW WATERWAYS
  - TRILUX

TRILUX 33
TRILUX PROP-O-DREV
UNI-PRO
VC 17M
VC 17M EXTRA GRAPHITE
VC OFFSHORE WITH TEFLON
WATERWAYS PLUS

- **Jotun Paints**

ANTIFOULING SEAALU
ANTIFOULING SEAGUARDIAN
ANTIFOULING SEAQUANTUM CLASSIC
ANTIFOULING SEAQUANTUM FB
ANTIFOULING SEAQUANTUM LLL
ANTIFOULING SEAQUANTUM PLUS
ANTIFOULING SEAQUANTUM ULTRA