Antifouling Types, Leaching Rates and In-Water cleaning

by
Dr Colin D. Anderson
(Technical Director, Yacht N. America)

Antifouling Types

• There are three main antifouling technologies used on Yachts:
  – SPC (Self-Polishing Copolymer)
  – Ablative (Eroding, Self-Polishing, Soft)
  – Hard

• These work by slowing releasing biocides (most are based on Copper) from the coating surface.

• They differ in the mechanism of biocide release.

Antifouling Biocide Release Mechanisms

• Sea water is alkaline (pH ~ 8.2) and antifoulings work by having an acid binder component that can dissolve in sea water to release the biocides.

  Acid Binder + Biocides
  →
  Sea Water
  Dissolving Binder

  Released Biocides

Antifouling Biocide Release Mechanisms

• There are two main “soluble acids” used to enable biocide release in sea water:

  1. Rosin – Obtained from trees (~ 90% Abietic Acid)
     • High Rosin content ⇒ Ablative / Soft
     • Low Rosin content ⇒ Hard

  2. SPC (Self-Polishing Copolymer) Acrylics - Synthetic
The release of biocides is controlled by the type and amount of the acid resin, and not by the quantity of biocide in the paint.

The acid resin controls the thickness of the Leached Layer on the surface of the antifouling.

SPC and Ablative antifoulings exhibit a thinner leached layer than do the Hard antifoulings.

A thin leached layer gives a more efficient release of Biocides than does a thick leached layer.
### Antifouling Biocide Release Mechanisms

- High Copper content does not always mean high performance.
- Ablative paints generally show better performance compared to Hard paints, and so do not need to be in-water cleaned.
- In-water cleaning removes the leached layer and leads to increased copper release.
- In-water cleaning is not needed if the correct antifouling is used.

### Copper Antifouling Regulatory Status

- USEPA Re-registration
- EU Biocide Products Directive
- EPA-U.S. Navy UNDS Decision
- EU Countries - Status

THANK YOU