

Alaska Anti-Fouling Paint Applicator Manual



Category Five

In general, applicators who apply pesticides to property other than their own must obtain certification from the Alaska Department of Environmental Conservation (ADEC) Pesticide Program. Applicators who apply restricted-use pesticides, regardless of location, must also be certified.

Individuals who apply anti-fouling paint commercially or who apply restricted-use paints must be certified as Anti-Fouling Paint Applicators, under Category Five. This manual provides the information needed to successfully complete a written examination to obtain that category certification.

The information needed to successfully complete the written core examination required for all certified pesticide applicators in Alaska includes:

1. National Pesticide Applicator Certification Core Manual;
2. Alaska Core Manual; and
3. State of Alaska Pesticide Regulations in Title 18, Chapter 90 of the Alaska Administrative Code (18 AAC 90)

The information needed to successfully obtain certification in Category Five in Alaska is covered in this Alaska Manual.

Learning Objectives

- List some problems caused by fouling organisms on ships and underwater structures.
- List the two ways that anti-fouling paints can control marine fouling organisms.
- List three essential characteristics of anti-fouling paint.
- Define the term release rate.
- Explain some factors which influence release rate of a paint.
- Describe the two main categories of anti-fouling pesticidal paint, and list some advantages and disadvantages of each.
- Define the terms ablative and sloughing.
- Explain how non-pesticidal paints may be used to control marine fouling organisms.
- Explain why TBT is no longer available.
- Explain some concerns over the use of copper-based paints.
- List some alternative active ingredients that may be used instead of copper-based paints.
- List some health problems that may occur during paint removal.
- Describe best management practices for removal of anti-fouling paint.
- Describe best management practices for application of anti-fouling paint.

MARINE FOULING ORGANISMS

There are thousands of aquatic species that may grow on underwater surfaces, including marine or freshwater plants; algae; seaweed; animals, such as barnacles, mussels, and tubeworms; and other organisms such as bacteria and diatoms, which can form a slime film on surfaces. Correct identification of the pest is required to determine the most appropriate control method.

WHY ANTI-FOULING PAINTS ARE USED

The growth of fouling organisms on the hulls of ships and other structures submerged in seawater is referred to as “fouling”. Fouling on the hull of the ship decreases the speed and increases fuel consumption. Fouling also increases the weight of buoys and other navigational equipment, interferes with moving equipment and underwater sound devices, clogs underwater pipes, and promotes corrosion of underwater surfaces. Anti-fouling paints either kill existing fouling organisms or prevent the fouling organisms from anchoring and growing on these surfaces.

PAINT PROPERTIES

To be effective, the anti-fouling paint must release active ingredients in sufficient quantities to eliminate or inhibit the fouling organisms. The paint must be durable so that the active ingredient is released over an extended period of time to provide fouling control as long as possible without requiring removal and/or repainting. In addition, paint should not adversely affect the environment. Some surfaces, such as aluminum, require specific formulations of anti-fouling paint.

The **release rate** of anti-fouling paint refers to how much of the active ingredient is released or emitted over time. A large release rate means that a large amount of pesticide is emitted. This means that the paint is more toxic to fouling organisms than a paint with the same active ingredient, but with a smaller release rate. It may also mean that the amount of pesticide ‘available’ to be released will run out sooner.

Release rates vary depending on the product used and the environmental conditions. Differences in berthing locations, operating schedules, length of service, condition of paint film surface, as well as the temperature, pH, and salinity of the water can all affect release rates.

TYPES OF ANTI-FOULING PAINT

There are many types of anti-fouling paints available. Each has different characteristics that make it appropriate for various different situations. Drying time, effect of exposure to air, re-application intervals, and other properties vary considerably between products. There are two main categories of anti-fouling pesticidal paint; eroding and hard surface.

Eroding paints continually wear away or decompose, constantly revealing a new surface layer. Each layer includes pesticides, which are emitted as that layer is exposed. Eroding paints may be **ablative**, which wear or erode away gradually; or **sloughing**, which shed coarse chips or flakes of paint. These paints have a constant release rate over time, as new biocide is constantly exposed. As long as there is paint on the hull, the biocide continues to be released. However, these paints may be less durable for boats that cover large distances or move at fast speeds, as this would tend to increase wear. Several coats are necessary to allow for constant wearing away. These hulls should never be scrubbed while in the water, as excessive amounts of pesticide could be released

during cleaning. The efficacy of ablative copolymers is not affected by time out of water, while sloughing paints tend to lose efficacy quickly when exposed to air.

Hard surface paints or leaching paints do not wear away as quickly. Instead, hard paints such as **modified epoxies** or vinyl paints contain embedded copper or other biocide, which leaches out of the paint surface. Although the paint remains in place, the biocide gradually wears away, allowing water to penetrate deeper into the paint and expose more biocide. Leaching paints emit high levels of pesticide initially, and gradually taper off. The paint remains on the hull, and must be removed once the biocide is no longer being released at effective rates. These paints gradually lose potency when not submerged.

There are also non-pesticidal paints that deter fouling by creating a slick surface which fouling organisms cannot adhere to, or attach poorly and slide off when the vessel moves. These paints are often silicone or Teflon based. The products work best for high activity vessels where motion through the water tends to remove fouling organisms. These coatings are easily damaged, and any irregularities on the surface can allow fouling organisms to attach more securely.

Many of these products contain some biocides that work in conjunction with their slick physical characteristics. However, silicone-only or Teflon-only products would not be considered pesticides because they provide a physical barrier only, and no chemical barrier.

Anti-fouling paints come in a variety of formulations to meet the needs of pesticide control. Every application of anti-fouling products should follow label directions and specifications. The following list of anti-fouling paint characteristics should guide your determination of which product to use to maximize pest control and environmental safety:

ACTIVE INGREDIENTS IN ANTI-FOULING PAINT

TBT Paints

Tributyltin (TBT) was widely used for many years, but is no longer available. TBT paints have high level of acute and chronic toxicity to non-target aquatic organisms including fish, clams, oysters, shrimp, crabs, and algae. TBT bio accumulates in the food chain, and therefore can also affect marine mammals and other higher level organisms. Harmful levels of TBT have been found in the waters in and around marinas, dry-docks, and poorly flushed harbors, and have been detected in marine mammals.

As a result of these problems, an international treaty banning the use of TBT paints on boat hulls took effect in September 2008. Many countries which are destinations for yachts and other boats from the U.S. are enforcing this ban. Owners of U.S. vessels should examine their hulls to determine if their boat is compliant with the ban. If not, they should replace their current TBT based coating with one that is free of TBT.

Copper Based Paints

Copper based paints are currently the most widely used anti-fouling paints. Copper is an effective anti-fouling active ingredient, and there are currently several products registered and approved for use in Alaska. Different formulations are designed for optimal performance under varying

conditions. Certain types of algae are resistant to copper-based paints, and must be treated with additional biocides known as booster biocides.

However, there are a number of potential environmental impacts that may occur from using copper anti-fouling paints, including toxicity to mussels, clams, and other shellfish; impacts to some species of fish; and inhibition of phytoplankton (the basis of the marine food chain). Concerns are rising over the levels of copper found in high use marine areas with poor circulation. As a result, copper based anti-fouling paint is being banned in several locations in Europe and other parts of the world, and even some local areas within the US.

Alternative Paints

New, less environmentally damaging anti-fouling products are being developed on a regular basis. Various claims are made about the effectiveness of products containing active ingredients such as Tralopyril, 4,5-dichloro-2-*n*-octyl-4-isothiazolin-3-one (DCOI), zinc pyridine, and other pesticides. Many of products containing these active ingredients are registered for use in Alaska.

REMOVAL AND APPLICATION OF ANTI-FOULING PAINTS

Proper application of the paint is critical to ensure that the paint adheres correctly and remains in place for as long as possible. Preparation and application must be done precisely in accordance with the product label instructions.

Most paints contain hazardous substances such as solvents and active ingredients that must be handled with care. Common problems include irritation to the skin, lung or respiratory system, and eyes, caused by direct contact with paint, overspray, fumes, or paint dust resulting from sanding or removal procedures. All personal protective equipment specified on the label must be correctly worn throughout all handling and processing involving removal of old paint and application of new paints.

Before applying anti-fouling paints it is highly recommended to review the following Federal regulations as they may apply and consequently affect the type, application, and use of anti-fouling products:

- The Clean Air Act (CAA)
- National Emissions Standards for Hazardous Air Pollutants (NESHAP)
- Clean Water Act
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
- National Environmental Policy Act (NEPA)

Best Management Practices for Removal of Anti-fouling Paint

Common methods of paint removal include scraping, sanding, solvent-based paint stripping, and abrasive blasting. These processes create the potential for pesticide contamination by the paint chips, particles and solvents produced. The following methods should be employed when possible to avoid pesticide contamination or injury:

- Many anti-fouling agents are considered to hazardous material by the EPA. *Before* beginning paint removal, obtain the Safety Data Sheet for the anti-fouling paint to be removed and cross reference with the current list of hazardous materials on the EPA's website to determine if special disposal procedures are required.

- Always conduct paint-removal activities inland, away from marine or surface water.
- Use only dustless sanders for paint removal to reduce air particulates
- Avoid outdoor paint removal activities on windy days.
- Use air filtration systems, dustless vacuum systems, and drop cloths to contain and collect the particulate and paint chips that are produced in the removal processes.
- Never use a hose to wash paint chips or particulates from any area.
- Collect and properly dispose of all debris immediately.

Best Management Practices for Application of Anti-fouling Paint

Common methods of painting include using brushes, rollers, and paint sprayers. These methods each have advantages and disadvantages in terms of ease, effectiveness and economic feasibility. The following methods should be employed when possible to avoid pesticide contamination or injury:

- Always conduct painting activities inland, away from marine or surface water.
- Mix only the amount of paint needed for the job.
- Use paint rollers and brushes in place of pressurized paint sprayer systems to reduce airborne particulates.
- If using pressurized paint spraying systems, use sheeting where appropriate to reduce drift and non-target contamination by anti-fouling paints.
- Avoid outdoor painting activities on windy days.
- Use air filtration systems and drop cloths to contain and collect spilled paint, drippings or other paint additives.

CALCULATIONS

Precise and accurate application is important for every pesticide application. However, calculations required for correct application of anti-fouling paints are generally less complex. For this category, math skills will not be tested.

Before Using Any Pesticide

STOP

**All pesticides can be harmful to health
and environment if misused.**

**Read the label
carefully and use
only as directed.**