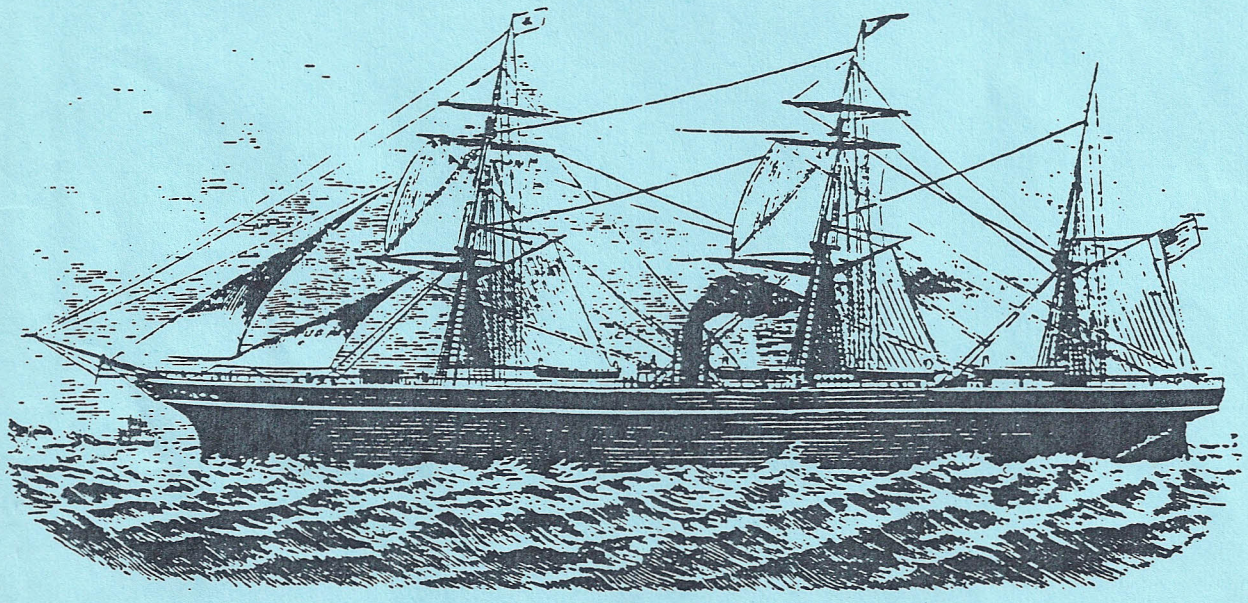
ANTIFOULANT PAINTS



This manual was developed in cooperation with the Georgia Department of Agriculture.

COOPERATIVE EXTENSION SERVICE / THE UNIVERSITY OF GEORGIA / COLLEGE OF AGRICULTURE / ATHENS

Acknowledgements

This manual was written by the National Paint and Coatings Association, Washington, D.C., to assist in the certification of TBT antifouling paint applicators. The second edition was edited and revised by the Special Review Branch, Special Review and Reregistration Division and Certification and Training Branch, Field Operations Division of the U.S. Environmental Protection Agency Office of Pesticides Programs. The manual was adapted for use in Florida by O. Norman Nesheim, Pesticide Information Coordinator of the Pesticide Information Office, UF, IFAS and modified for use in Georgia by Burton R. Evans, Extension Entomologist, University of Georgia, Athens, GA.

Abbreviations

EPA	United States Environmental Protection Agency
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
MSHA	United States Mine Safety and Health Administration
NIOSH	National Institute of Occupational Safety and Health
OSHA	United States Occupational Safety and Health Administration
OAPCA	Organotin Antifouling Paint Control Act
PEL	Permissible Exposure Limit
RCRA	Resource Conservation and Recovery Act
TBT	Tributyltin
EPD	Environmental Protection Division (Georgia)

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Introduction

This manual is a self-study booklet for pesticide applicators seeking certification in Category 39, Antifoulant Paints.

"Organotin" refers to a broad group of related chemicals - much like an extended family that includes aunts, uncles and cousins. On the other hand, "tributyltin" refers to a smaller group (similar to family members all with the same last name). Tributyltin is often abbreviated as "TBT". Certain TBT compounds are used as pesticide ingredients in antifouling paints. Whenever possible, this manual uses "TBT" when referring to tributyltin compounds. The reader should be aware, however, that other literature sometimes uses the terms ORGANOTIN and TRIBUTYLTIN (or TBT) interchangeably.

Antifouling paints are surface coatings applied to hulls and other underwater parts of vessels. Their main purpose is to prevent or control the growth of aquatic plants and animals (pests) on boat hulls, keels, propellers and the like.

Some antifouling paints contain TBT. TBT is the active ingredient in the paint, that is, TBT is the substance that actually controls the pest. TBT is a pesticide ingredient. Antifouling paints containing TBT are registered as pesticides.

The U.S. Environmental Protection Agency (EPA) has determined that almost all antifouling paint products containing TBT must be classified as "RESTRICTED USE PESTICIDES". Because of the EPA restricted use pesticide classification, sale and use of antifouling paints containing TBT must follow the federal and state rules governing pesticide-related activities.

Because TBT antifouling paints are classified as restricted use pesticides, their requirements for handling, application and disposal differ from the techniques for using other types of paints. For example, because of TBT's restricted use classification, a certified applicator MUST be present during any activity involving TBT paint. The modules in this manual discuss each of the various aspects of TBT paint use that must be understood and followed by a certified applicator.

In addition to the procedures described in this manual, the TBT paint applicator must be sure to comply with shipyard rules, paint manufacturer directions, and all applicable federal, state and local laws. When these are combined with good painting practices and the TBT paint use procedures indicated in this manual, the results should provide adequate protection for humans, nontarget aquatic organisms and the environment.

Chapter 1
FEDERAL LAWS AND REGULATIONS

A. Learning Objectives

After completion of the study of the laws and regulations, the trainee should be able to:

- Know which federal and state laws apply to the use of TBT antifouling paint.
- Know the difference between a "restricted use" and "general use" pesticide.
- Understand the responsibilities of a certified applicator.
- Know the penalties for violating the law.
- Understand the recordkeeping requirements and be able to complete the form.

B. Discussion

In order to protect the public health and welfare and to prevent adverse effects on the environment, it is essential that pesticides be regulated. The purpose of the federal and state pesticide acts is to regulate the labeling, sale, storage, transportation, application and the disposal of pesticides. EPA has determined that TBT compounds used in antifouling paints exceed the risk criteria for exposure of nontarget aquatic organisms to concentrations which are acutely or chronically toxic to such organisms. State restrictions on pesticide cannot be more liberal than those of FIFRA. Individual states may, however, impose stricter regulations on a pesticide, and applicators must comply with these requirements.

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) regulates the registration, manufacture, transportation and use of pesticides. The law affects the applicator in many ways. Specifically, it provides that:

- all pesticides must be used only as directed in the label;
- all pesticide uses must be classified as "restricted" or "general". Restricted use pesticides are classified under Section 3(d)(1)(c) of FIFRA;
- persons who buy restricted-use pesticides must be certified as pesticide applicators; persons who use restricted use pesticides must either be certified applicators or working under the direct supervision of a certified applicator;
- persons who do not obey the law will be subject to fines and jail terms.

Restricted and General Use Pesticides

All pesticides are classified according to their potential hazards under those circumstances in which they are to be used. The two classifications are general use and restricted use. General use pesticides generally have lower toxicity with less potential hazard to humans and the environment than restricted use chemicals. They can be

bought and used by the general public without special permit or restriction. They must, however, always be used according to label directions. Restricted use pesticides may be sold only to certified applicators and must be used only by those applicators or by persons working under their direct supervision. Restricted use pesticides and their uses could cause human injury or environmental damage unless they are applied by persons who have demonstrated their competency by obtaining their certification, in the appropriate category, as a pesticide applicator, from an EPA approved State, Federal, or Tribal Certification Program. TBT used as a component in antifouling paint has been classified by EPA as a restricted use pesticide. As a result, all commercial applicators of the antifouling paint must be certified by the applicable state programs or under the direct supervision of an on-site certified commercial applicator before performing any task associated with the TBT antifouling paint.

Certified Applicators

From 40 CFR Part 171.2 the term "certified applicator" means any individual who is certified to use or supervise the use of any restricted use pesticides covered by his/her certification.

Persons who are not certified pesticide applicators may not purchase restricted use pesticides; noncertified persons may not apply restricted use pesticides unless they are under the direct supervision of a certified applicator. Certification requires training or testing for competency in the safe and effective handling and use of these pesticides. Your state or a federal agency will conduct the training and/or tests for certification. Certification is proof that you know the safe and correct way to carry out restricted uses. EPA has set minimum standards of competency for all commercial applicators. Your state has developed a plan for competency certification that meets minimum national standards.

The term "under the direct supervision of" means the act or process whereby the application of a pesticide is made by a competent applicator acting under the instructions and control of a certified applicator who is responsible for the actions of that person and who is available if and when needed, even though such certified applicator is not physically present at the time and place the pesticide is applied.

All commercial applicators shall demonstrate practical knowledge of the principles and practices of pest control and safe use of pesticides. Testing shall be based on examples of problems and situations appropriate to the particular category or subcategory of the applicator's certification and the following areas of competency: label and labeling comprehension, safety, environment, pests, pesticides, equipment, application techniques.

Penalties

In general, any registrant, commercial applicator, wholesaler, dealer, retailer, or other distributor who violates any provision of the Federal Insecticide, Fungicide or

Rodenticide Act (FIFRA) may be assessed either a criminal or a civil penalty by the EPA. A criminal penalty of not more than $25,000 and/or 1 year imprisonment may be assessed for knowingly violating any provision of FIFRA. A civil penalty of not more than $5,000 may be assessed for unknowingly violating any provision of FIFRA. State restrictions on pesticides cannot be more liberal than those of FIFRA. Individual states may impose stricter regulations on a pesticide.

Recordkeeping

Certified commercial applicators or users of tributyltin will be required to maintain, at a minimum, for two years, records of the kinds of products, uses, dates and application sites of restricted use products containing TBT. "Uses" will include the disposal site of TBT containing dust, chips, or other waste. Therefore the location and dates of disposal will be a recordkeeping requirement. "Application site" is determined to be not only the geographic location of the application site, but also the identification of the vessel receiving the application. Enclosed is a sample form for our recordkeeping requirements.

Suggested recordkeeping form for TBT applicators

APPLICATOR INFORMATION

Certified supervisor: _____

Applicator (if different): _____

Address: _____ Telephone: _____

APPLICATION INFORMATION

Application date: _____ Time of application: _____

Target pest(s): _____ Equipment used: _____

Vessel: _____

Identification number: _____ Owner: _____

Application site: _____

Geographic location: _____ City: _____ State: _____

Area treated (sq. ft.) or hull length and beam of vessel: _____

PAINT INFORMATION

Trade name: _____ Manufacturer: _____

EPA registration number: _____ Amount used: _____

DISPOSAL INFORMATION

Size and number of empty containers: _____

Description and location of container disposal: _____

_____ Date: _____

Amount & type of solvent/rinsate: _____

Description and location of solvent disposal: _____

_____ Date: _____

Amount excess paint: _____

Description and location of excess paint disposal: _____

_____ Date: _____

GEORGIA LAWS AND REGULATIONS

Many Federal statutes, such as the Federal Insecticide Fungicide and Rodenticide Act, and regulations delegate certain regulatory powers and responsibilities to the state governments. State laws and regulations must be written for the state to assume these powers and responsibilities. In general, the Georgia laws and regulations that are discussed in this manual were written for that purpose as well as to meet other governmental needs of Georgia citizens.

Georgia Pesticide Use and Application Act of 1976

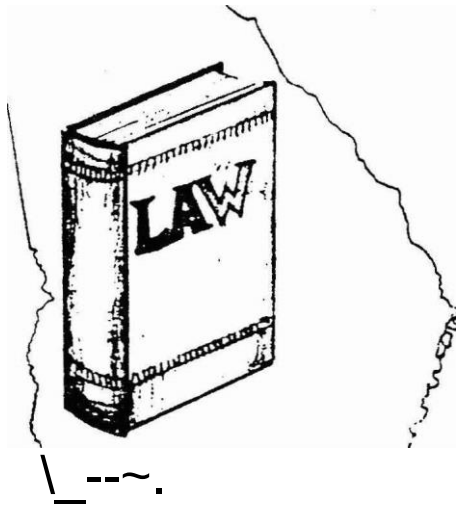
The application and use of pesticides as well as the storage and disposal of pesticides and pesticide containers in Georgia are regulated under the Georgia Pesticide Use and Application Act of 1976. This act is administered by the Commissioner of Agriculture through the Entomology and Pesticide Division of the Georgia Department of Agriculture. All uses of pesticides in Georgia except those regulated under the Georgia Structural Pest Control Act are regulated under this act.

Licensing Requirements

Any pesticide which is applied for a fee and any restricted use pesticide must be applied by or under the supervision of a licensed Pesticide Applicator who is reasonably available. In some instances, special regulations on the pesticide label may require that the licensed applicator be physically present or apply the pesticide himself. Restricted use pesticides can be purchased only by a licensed Pesticide Applicator or someone under his supervision. Each business location that is engaged in applying pesticides for hire must have a Pesticide Contractor's License and at least one licensed Commercial Pesticide Applicator employed fulltime. Licenses are granted by the Entomology and Pesticide Division of the Georgia Department of Agriculture.

Pesticide Contractor's License

This is a company license required to be engaged in the business of applying pesticides and does not qualify any applicators to apply or supervise the application of pesticides. Proof of financial responsibility and a license fee of $90.00 are required. Each contractor must have at least one Commercial Pesticide Applicator in fulltime employment during periods of pesticide applications.



Commercial Pesticide Applicator's License

This license is required if you want to apply a restricted use pesticide and you do not qualify as a private applicator. If you work for or as a licensed Pesticide Contractor applying any pesticide to the lands of another you must have a Commercial Pesticide Applicator's License, unless you work under the supervision of someone else who is licensed. It does not permit you to charge a fee unless you also have a Pesticide Contractor's License. Restricted use pesticide applications and purchased must be confined to only those categories for which you are authorized by your license.

To obtain a Commercial Pesticide Applicator's License, you must pass an examination on this manual.

Commercial Applicators must earn a required number of recertification credits every five years or be reexamined. Recertification credits may be earned by attending educational meetings which are approved by the Department of Agriculture. A booklet, "Training Sources for Recertifying Georgia Pesticide Applicators", which lists most of the meetings at which recertification credits may be earned will be sent to licensed Commercial Pesticide Applicators each year. The certification categories and the number of recertification credits required every five years are listed below:

Category	Number	Hours Credit Required Every 5 Years
Plant Agriculture Pest Control	21	10
Animal Agriculture Pest Control	22	6
Forest Pest Control	23	6
Ornamental & Turf Pest Control	24	10
Seed Treatment	25	6
Aquatic Pest Control	26	6
Right-of-Way Pest Control	27	6
Fumigation*	28	6
Household Pest Control	29	10
Wood Destroying Organisms	30	10
Public Health Pest Control	31	10
Regulatory Pest Control	32	6
Industrial, Institutional, Structural & Health Related Pest Control	35	6
Wood Treatment	36	6
Anti-microbial Application	37	6
Ag. Commodity Fumigation	38	6
Demonstration and Research	33	0
Aerial Application Authorization	34	0
Antifoulant Paints	39	6

*Fumigation (28) includes structures, but not agricultural products. Food, feed, seed, and other plant materials (i.e. cut flowers) are under category 38.

Private Pesticide Applicator's License

This license authorizes, or certifies, you to purchase and use or supervise the use of restricted use pesticides to produce an agricultural or forestry commodity. All applications on property that is not owned or rented by you or your employer must be done as a personal favor or as an exchange of personal services. No fee can be charged.

You can obtain a Private Pesticide Applicator's License by attending a special training course provided by your county Extension office, which will then notify the Department of Agriculture. To keep your license you must earn three hours of

recertification credit every five years. Otherwise you will have to attend another training course provided by your county Extension office or pass an examination. Recertification credits can be earned by attending certain growers' meetings given by the county Extension office and also by attending short courses and other meetings that are approved by the Georgia Department of Agriculture, Entomology and Pesticide Division.

Records

The licensed pesticide contractor must keep a record of all pesticide applications that are made as part of his business. Any licensed Commercial Pesticide Applicator who is not operating under a Pesticide Contractor's License must keep a record of all restricted use pesticide applications. Licensed Private Applicators are not required to keep records.

Equipment

All motorized application equipment that is used in applying pesticides for a fee must be registered, inspected and bear a decal issued by the Georgia Department of Agriculture.

Damages

Any claims for damages resulting from a pesticide application should be reported on a prescribed form to the Georgia Department of Agriculture within 60 days after damages occurred, but before 25 percent of a damaged crop shall have been harvested.

Georgia Pest Control Act of 1976

This act is administered by the Commissioner of Agriculture through the Entomology and Pesticide Division of the Georgia Department of Agriculture to regulate the distribution and sale of pesticides in Georgia. No pesticide can be distributed or sold in Georgia unless it is registered by the Georgia Department of Agriculture as well as the U.S. Environmental Protection Agency.

Any business location which sells restricted use pesticides must have a Restricted Use Pesticide Dealer's License. The dealer is required to determine that the purchase is authorized by either a licensed Private Pesticide Applicator or licensed Commercial Pesticide Applicator before a restricted use pesticide is sold or delivered. Dealers are required to keep a record of all restricted use pesticide sales.

Georgia Hazardous Waste Management Act of 1979

In October 1976, Congress passed the Resource Conservation and Recovery Act (RCRA) which was the initial legislation aimed at protecting human health and the environment from improper hazardous waste management activities. In March 1979, Georgia followed with passage of the Georgia Hazardous Waste Management Act.

It is anticipated that both the federal and state statutes and regulations will continue to be amended frequently in the foreseeable future. For this reason, anyone who is a potential hazardous waste generator or handler would be well advised to inquire frequently about changes through their trade organization, the Georgia Environmental Protection Division (EPD), Generator Compliance Unit (404) 362-2684 or Georgia Tech Research Institute, Hazardous Waste Technical Assistance Program (404) 894-3806. For questions on hazardous waste disposal, Georgia Tech is the best source.

Solid Waste: A pesticide becomes a SOLID WASTE when the owner of that material determines that it is of no further use or value to him and he is ready to discard it. Contamination from spills is also a solid waste. Examples of pesticides becoming wastes are: out-dated-materials, unused spray, spills, empty containers, rinsate, etc.

Hazardous Waste: A soil waste is HAZARDOUS if it may cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or may pose a hazard to human health or the environment when improperly managed.

Generator: A generator is anyone who generates 2.2 pounds of Acute Hazardous waste and/or 220 pounds of hazardous waste during any calendar month. Generators must meet specific requirements. Contact EPD for more information.

Small Quantity Generators: A Small Quantity Generator is defined as a person who generates less than 2.2 pounds of Acute Hazardous waste and/or between 220 to 2,200 pounds of Hazardous waste in any calendar month.

Commercial and private pesticide applicators may qualify as hazardous waste generators. Some larger operations, or those with improper practices, such as a surface impoundment receiving rinsate or accumulating large piles of unrinsed containers may even require a permit as a Hazardous Waste Treatment, storage, or disposal facility. Under the Georgia Hazardous Waste Management Act any person in violation can be subject to a civil penalty of up to $25,000.00 per day for each day a violation exists or to a criminal penalty, the maximum of which is a fine of $50,000.00 per day for each day the violation exists and imprisonment not to exceed two years, when the person is convicted of knowingly committing violations.

Chapter 2
LABELS AND LABELING

A. Objectives

After completing this chapter, you should know:

- How to distinguish a label from labeling.
- The contents of a pesticide label and location and interpretation of each part.
- The term "Use Inconsistent With Labeling."
- The importance of reading labels and labeling before each use of the pesticide.

B. Discussion

1. Registration

Because antifouling paints prevent, destroy or repel plant and animal life on underwater surfaces, they are considered pesticides and are regulated by FIFRA. Every pesticide sold, bought and used in the United States must, by law, be registered by EPA. EPA approves the pesticide itself, each separate use for which it is intended, and the pesticide label and labeling.

a. Labels versus labeling

Each pesticide has instructions on how to use the product. The **label** is the information printed on or attached to the pesticide container. **Labeling** is all information that you receive from the manufacturer about the product. Labeling includes both the label on the product container and any supplemental information accompanying the product. Labeling includes such things as brochures and leaflets available from the paint dealer or manufacturer.

As pesticide information becomes more detailed and complex, information is moved from the pesticide label to supplemental labeling accompanying the product.

Applicators must read the label and supplemental labeling, and understand all information, before using TBT paints. The information contained on the product label itself and the supplemental labeling is registered by EPA. You must comply with both.

b. Product identification

1) Brand or trade name - Each manufacturer has brand names for its products. Different manufacturers use different brand names for the same pesticide active ingredient. The brand or trade name is the one used in ads and by company salespersons. The brand name shows up plainly on the front panel of the label. Beware of choosing a pesticide product by brand name alone. Many companies use the same basic

name with only minor variations to designate entirely different pesticide chemicals. An example of a brand or trade name as it might appear on a TBT product label is presented in Attachment A p. 21 at the end of this chapter.

Beware of choosing a pesticide product by brand name alone. Many companies use the same basic name with only minor variations to designate entirely different pesticide chemicals. Before choosing a pesticide product, always read the product's ingredient statement.

2) **Ingredient statement** - Each pesticide label must list what the active ingredients are and the percentage amount of each ingredient listed. The ingredient statement must list the official chemical names and/or common names for the active ingredients. Inert (inactive) ingredients usually are not named, but the label must show what percent of the total contents they comprise.

3) **Chemical name** - The chemical name identifies the chemical components of the pesticide. This name is listed in the ingredient statement on the label. An example of a chemical name is bis(tributyltin) oxide.

4) **Common name** - Because some pesticide active ingredients have complex chemical names, many are given a shorter "common name." Only common names that are officially accepted by EPA may be used in the ingredient statement on the pesticide label. The official common name may be followed by the chemical name in the list of active ingredients.

5) **Type of pesticide** - The type of pesticide is usually listed on the front panel of the pesticide label. This statement usually indicates, in general terms, the intended purpose of the product, such as antifouling paint.

6) **Type of formulation** - Pesticides are rarely made up of only active ingredients. Usually, they are combined with inert chemicals in a mixture called a pesticide formulation.

7) **Net contents** - This statement appears on the front panel of the pesticide label. It indicates the volume of formulation (in gallons or liters) held by the container.

8) **Manufacturer's name and address** - The law requires the manufacturer or distributor of a product to put the name and address of the company on labels and labeling. This is so you will know who to contact for additional information.

9) **Registration and establishment numbers** These numbers are needed by the pesticide user in case of accidental poisoning, claims of misuse or liability claims.

10) **Registration numbers** - An EPA registration number (for example, EPA Reg. No. 3120-280-AA) must appear on each pesticide label. It indicates the pesticide labeling has been approved by the federal government. In cases of special local need, pesticide

products may be registered by a state. These registrations are designated, for example, as EPA SLN No. FL-770009. In this case, SLN indicates "special local need" and FL means that the product is registered for use in Florida.

11) Establishment numbers - The establishment number (for example, EPA Est. No. 5840-AZ-1) appears on either the pesticide labeling or container and identifies the facility that made the product. In case something goes wrong, that facility can be traced.

c. Signal words and symbols

Every pesticide label must display a signal word that indicates how toxic the pesticide is to humans. The signal word is based on the acute (short-term) toxicity of the formulated pesticide; therefore, it reflects both the acute toxicity of the active ingredient, and that of the solvents and inert ingredients.

The signal word represents the **highest** acute toxicity obtained from five separate tests: oral toxicity, dermal toxicity, inhalation toxicity, eye irritation potential, and skin irritation potential. If any of the five tests results in a high acute toxicity rating, then the signal word for the pesticide product is **DANGER** - even if the other four test results indicate moderate or slight acute toxicity ratings.

Knowing the product's acute toxicity helps you choose the proper precautionary measures for yourself, your workers, and other persons who may be exposed. The signal word must appear in large letters on the front panel of the pesticide label. It immediately follows the statement "Keep Out Of Reach Of Children."

DANGER - This word signals that the pesticide is highly toxic for one or more of the toxicity test categories. Any product that is highly toxic orally, dermally, through inhalation, or causes severe eye or skin burning, is labeled "DANGER."

POISON AND THE SKULL AND CROSSBONES SYMBOL - All pesticides that are highly toxic orally, dermally or through inhalation also carry the word "POISON" (printed in red) and the skull and crossbones symbol. Pesticides that have the signal word "DANGER" due only to skin or eye irritation potential do not carry the skull and crossbones symbol or the word "POISON" (in red).

WARNING - This word signals that the pesticide is moderately toxic. Any pesticide whose highest acute toxicity (orally, dermally, through inhalation, or for eye or skin irritation potential) is rated as moderate has the signal word "WARNING."

CAUTION - This word signals that the pesticide is slightly toxic. Any pesticide whose highest acute toxicity (orally, dermally, through inhalation, or for eye or skin irritation potential) is rated as slight has the signal word "CAUTION."

THE SIGNAL WORD ON TBT PAINTS IS DANGER.

d. Toxicity statements

Many pesticides are toxic to humans. Exposure to them without proper protection can sicken or kill humans. Some pesticides are much less toxic; large exposures to these poisons would be necessary to cause illness. Others can irritate the nose, throat, eyes and skin. Pesticides can enter the body in three major ways:

- through the mouth (orally)
- through the skin or eyes (dermally)
- through the lungs (by inhalation)

People may be poisoned without realizing the seriousness of the exposure, especially if the pesticide enters through the skin and lungs.

1) Acute toxicity statement- The statements that immediately follow the signal word, either on the front or the side of the pesticide label, indicate which route or routes of entry (mouth, eyes, skin, lungs) you must particularly protect.

Many pesticides are hazardous by more than one route, so study these statements carefully. A "DANGER" signal word followed by "May be fatal if swallowed or inhaled" gives a different warning than "DANGER: Corrosive. Causes skin burns and eye irritation."

2) Oral toxicity statements - The pesticide label usually indicates how hazardous a pesticide is if you swallow it. If the pesticide is highly toxic (DANGER) orally, typical label statements are: "FATAL if swallowed" or "Can kill you if swallowed." If the pesticide is moderately toxic (WARNING) orally, typical label statements are: "Harmful or fatal if swallowed" or "May be fatal if swallowed If the pesticide is slightly toxic orally (CAUTION), typical label statements are: "Harmful if swallowed" or "May be harmful if swallowed."

THE ORAL TOXICITY STATEMENT FOR TBT PAINT IS: "MAY BE FATAL IF SWALLOWED."

3) Dermal (skin) toxicity statements - The pesticide label indicates how hazardous a pesticide is if it enters your body through the skin. If the pesticide is highly toxic (DANGER) dermally, typical label statements are: "Fatal if absorbed through the skin" or "Can kill you by skin contact" combined with the statement "Do not get on skin or clothing." If the pesticide is moderately toxic (WARNING) dermally, typical label statements are: "Harmful or fatal if absorbed through the skin" or "May be fatal by skin contact" followed by a statement such as, "Do not get on skin or clothing." If the pesticide is slightly toxic (CAUTION) dermally, typical label statements are: "Harmful if absorbed through skin" or "May be harmful by skin contact" combined with the statement "Avoid contact with skin or clothing."

THE DERMAL TOXICITY STATEMENT FOR TBT PAINTS IS: "HARMFUL IF ABSORBED THROUGH SKIN. DO NOT GET ON SKIN, CLOTHING OR EYES."

4) Inhalation toxicity statements - The pesticide label indicates how hazardous a pesticide is if it enters your body through breathing. If the pesticide is highly toxic (DANGER) through inhalation, typical label statements are: "Poisonous if inhaled" or "Can kill you if breathed" combined with "Do not breathe dusts, vapors or spray mist." If the pesticide is moderately toxic (WARNING) through inhalation, typical label statements are: "Harmful or fatal if inhaled" or "May be fatal if breathed" followed by a statement such as "Do not breathe dusts, vapors or spray mist." If the pesticide is slightly toxic (CAUTION) through inhalation, typical label statements are: "Harmful if inhaled" or "May be harmful if breathed" combined with "Avoid breathing dusts, vapors or spray mists."

TBT PAINTS HAVE THE INHALATION TOXICITY STATEMENTS: "HARMFUL IF INHALED. USE IN A WELL-VENTILATED AREA."

5) Eye irritation statements - The pesticide label indicates how irritating a pesticide is if it gets into your eyes. If the pesticide is highly irritating or corrosive (DANGER) to the eyes, a typical label statement is: "Corrosive. Causes severe eye burns or blindness" combined with "Do not get in eyes." If the pesticide is moderately irritating (WARNING) to your eyes, typical label statements are: "Causes eye irritation" or "Causes eye burns" followed by a statement such as "Do not get in eyes." If the pesticide is slightly irritating (CAUTION) to your eyes, a typical label statement is: "May irritate eyes" combined with "Avoid contact with eyes."

THE EYE IRRITATION STATEMENTS FOR TBT PAINTS ARE: "CORROSIVE. CAUSES SKIN BURNS AND EYE IRRITATION. DO NOT GET ON SKIN, CLOTHING OR IN EYES."

6) Skin irritation statements - The pesticide label indicates how irritating a pesticide is to your skin. If the pesticide is highly irritating or corrosive (DANGER), a typical label statement is: "Corrosive. Causes severe skin burns" combined with "Do not get on skin." If the pesticide is moderately irritating (WARNING), typical label statements are: "Causes skin irritation" or "Causes skin burns' followed by a statement such as "Do not get on skin." If the pesticide is slightly irritating (CAUTION), a typical label statement would be: "May irritate skin" combined with "Avoid contact with skin."

THE SKIN IRRITATION STATEMENTS FOR TBT PAINTS ARE: "CORROSIVE. CAUSES SKIN BURNS AND EYE IRRITATION. DO NOT GET ON SKIN, CLOTHING OR IN EYES. MAY BE A DERMAL SENSITIZER."

7) Chronic toxicity statements - Some pesticides have been identified as possible hazards to humans through chronic (long-term) toxicity. These statements typically cite evidence in laboratory animals as the basis for possible chronic effects.

No chronic toxicity statement appears on TBT paint products at this time.

e. Precautionary statements

Pesticide labeling contains statements to help you decide the proper precautions to take to protect yourself, your helpers, and others who may be exposed. These statements are included under the heading "Hazards to Humans and Domestic Animals."

1) Special hazard precaution - The signal word is repeated at the beginning of the "Hazards to Humans and Domestic Animals" section. Sometimes the signal word is followed by a specific precaution. This precaution indicates the main hazard, tells how to avoid the hazard, and what to do if you are exposed.

2) Hazard to humans and domestic animals statements for TBT paints - Hazard statements are: *Corrosive. Causes skin burns and eye irritation. Harmful if absorbed through skin or inhaled. Do not get on skin, clothing or in eyes. May be a dermal sensitizer. Wear a face shield and rubbergloves when handling. Wear protective clothing, such as long-sleeved cotton shirt, long pants and hat. Use in a well-ventilated area. When used in confined areas or applied by spraying, wear protective clothing and a pesticide respirator jointly approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health. May be fatal if swallowed. If swallowed, promptly drink a large quantity of egg whites, gelatin solution or water. Avoid alcohol. Do not induce vomiting. Do not breathe vapors or spray mist.*

3) Wash hands precaution - Often pesticide labeling contains the statement: "Always wash your hands before eating, drinking, chewing, using tobacco or using the toilet." This precaution is worthwhile: although TBT paint pesticide labels do not contain this precaution, you should always heed it.

4) Ventilation - TBT paint labels list a ventilation precaution: *Use in a well-ventilated area. When used in confined areas or applied by spraying, wear protective clothing and a pesticide respirator jointly approved by MSHA and NIOSH.*

5) Application precautions - Most pesticide labeling prohibits applicators from spraying or dusting persons working in the area and in neighboring areas. While TBT paint labels do not contain such a statement, care should always be taken that workers nearby are not exposed.

6) After-use precautions - Pesticide labeling often instructs users to remove personal protective equipment and wash thoroughly after handling the pesticide. TBT **paint labeling does not contain a specific after-use precaution. However, you should always wash with soap and water after handling pesticides and contaminated clothing should be cleaned before being worn** again.

f. Protective clothing and equipment statements

To comply with federal and state laws, you must follow all requirements for protective clothing given on the label. However, the lack of any statement or mention of any one piece of equipment does not rule out its possible usefulness. No safety recommendation can cover all situations. You must use your knowledge of pesticide toxicity to assess the hazard and select the kind of protection you need.

The pesticide label lists the minimum equipment that must be worn when handling the pesticide. To determine the best type of protective clothing and equipment, use the signal word, the toxicity statements, the precautionary statements and the basic guidelines listed in Chapter 3 of this manual.

Protective clothing needed when handling TBT paints includes face shield, rubber gloves, long-sleeved cotton shirt, long pants and a hat. An approved pesticide respirator is required for spray applications or any application in confined areas.

g. Statement of practical treatment

Some pesticides are highly toxic to humans; a few drops on the skin can cause severe injury. Learn about injuries likely to be caused by the pesticides you use. **The TBT paint label gives first-aid instructions for accidental poisonings.**

1) Signs and symptoms of poisoning- Most pesticides list the signs and symptoms of pesticide poisoning on the product labeling. **There are no signs and symptoms listed on TBT paint labeling.**

2) First aid - First-aid statements provide the treatments recommended in case of poisoning by that product. **The first-aid statements on TBT paint labeling are:** ***In case of skin contact, remove contaminated clothing and immediately wash skin with soap and water. Get medical attention. Wash contaminated clothing before reuse. If inhaled, remove to fresh air. Use artificial respiration if breathing has stopped. Get medical attention. If swallowed, do not induce vomiting. If in eyes, immediately flush with plenty of water. Get medical attention.***

3) Antidote - An antidote is a medicine that counteracts the effects of the pesticide. Antidotes are usually listed on the pesticide label. **There is no antidote listed on TBT paint labels.**

4) Note to physician - All DANGER labeling and some WARNING and CAUTION labeling contain a note to physicians describing appropriate medical procedures for treating poisonings.

h. Environmental hazards

Pesticides can harm the environment. Some products are classified RESTRICTED USE because of environmental hazards. Special warning statements concerning hazards to the environment are included on pesticide labeling. You must adhere to these statements to comply with federal and state laws.

1) Special toxicity statements - If a particular pesticide is especially hazardous to wildlife, that is stated on the labeling. TBT paint labeling includes the statement: ***This product is toxic to aquatic organisms including fish and shellfish.*** This statement alerts you to the special hazards that the use of TBT paint may pose.

2) General environmental statements- These statements appear on nearly all pesticide labeling. They are instructions on how to avoid contaminating the environment. They must always be followed. Environmental statements are found on TBT paint labeling in the sections on Environmental Hazards, Directions for Use and Storage and Disposal. These statements include:

Do not apply directly to water.

Do not contaminate water by cleaning of equipment or disposal of wastes.

Do not allow chips and dust generated during paint removal to enter water.

During and after paint removal and/or application of new TBT paint, methods must be employed which are designed to prevent release of TBT paints into the aquatic environment.

Do not contaminate water, food or feed by storage or disposal.

i. Physical and chemical hazards

This section of the labeling identifies any fire, explosion or chemical hazards the product may pose. For example:

Flammable - Do not use, pour, spill or store near heat or open flame.

Do not weld or cut container.

NOTE: Hazard statements (hazards to humans and domestic animals, environmental hazards, and physical/chemical hazards) are not located in the same place on all pesticide labeling. Some labeling groups them in a box under the headings listed above. Other labeling may list them on the front panel beneath the signal word. Still others list the hazards in paragraph form under headings such as "Note" or "Important." Search the labeling for statements that will help you apply the pesticide as safely and knowledgeably as possible.

j. Classification statements

A pesticide, or some of its uses, is classified as restricted if it could cause harm to humans or the environment unless it is used by certified applicators. The word "use" refers to the following activities.

- application
- mixing and loading
- transporting, storing or handling pesticides after the manufacturer's seal is broken
- care and maintenance of application and handling equipment
- disposal of pesticides and their containers

When a pesticide is classified as restricted use, the label must state "Restricted use Pesticide" in a box at the top of the front panel. Below this heading may be a statement describing the reason for its restricted use classification. Usually another statement describes the category of certified applicator that can purchase and use the product.

EPA has determined that unrestricted use of TBT paints would cause unreasonable adverse effects on the environment, as a result, these products are classified as "Restricted use Pesticides." TBT paints must carry the following statement in a prominent place at the top of the pesticide labeling's front panel:

> *Restricted use pesticide due to toxicity to aquatic organisms including shellfish: For sale only to certified commercial applicators and for use only by certified commercial applicators or by persons under the direct supervision of an on-site (at the work site) certified commercial applicator.*

TBT paints may be applied only by a certified applicator or by persons working under the direct supervision of an on-site certified applicator.

k. Container storage, disposal, spill cleanup, transportation and handling

This section of the pesticide label gives specific directions for the storage and disposal of the pesticide. Often there are instructions for appropriate cleanup of spills and safe transportation of the product, and directions for handling pesticide containers.

One or more of the following statements may appear in the section titled "Storage and Disposal."

Storage statement - *Do not contaminate water, food or feed by storage or disposal.*

Disposal statement - *Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency or the hazardous waste representative at the nearest EPA regional office for guidance.*

Container disposal statement - *Dispose of empty container in a solid-waste landfill, or by other approved state and local procedures. Dispose of a product that cannot be used in accordance with its labeling directions following federal, state or local procedures under the Resource Conservation and Recovery Act (RCRA).*

Excess pesticide disposal statement - *Do not contaminate water, food or feed by storage or disposal. TBT paint that cannot be used according to label directions must be disposed of according to federal, state or local procedures under RCRA.*

1. Directions for use Instructions on how to use the pesticide are an important part of labeling. They provide information on where the pesticide may be used and the proper way to apply it. The use and application directions include:

- pests that the manufacturer claims the product will control
- surface the product is intended to protect
- proper equipment to apply the product

a. Inconsistent with labeling - A statement must appear on all pesticide products to indicate that the pesticide must be used as specified and directed on the product label and accompanying labeling information. The statement is: ***It is a violation of federal law to use this product in a manner inconsistent with its labeling.***

b. According to EPA - "...inconsistent with its labeling..." means that to avoid violating federal law, persons using a TBT paint product classified as a restricted-use pesticide MUST:

- At a minimum, wear all personal protective equipment indicated on the product label.
- Make sure any nonaluminum-hulled vessel being painted is at least 82 feet long.
- Avoid contaminating water with paint chips, spent abrasives and dust generated during removal of old TBT paint.
- Avoid contaminating water with TBT wastes generated during the cleaning of painting equipment or disposing of TBT containers.
- whether it is the pesticide you need for the job
- whether the pesticide can be used safely under your conditions

2) Before you *apply* the pesticide, read the labeling to determine:

- what protective equipment must be used
- what safety measures must be followed
- where the pesticide can be used
- how the pesticide may be applied
- whether there are restrictions on using the product

m. Reading labeling

1) Before you *buy* a pesticide, read the labeling to determine:

- whether it is the pesticide you need for the job
- whether the pesticide can be used safely under your conditions

2) Before you *apply* the pesticide, read the labeling to determine:

- what protective equipment must be used
- what safety measures must be followed
- where the pesticide can be used
- how the pesticide may be applied
- whether there are restrictions on using the product

3) Before you *store or dispose* of the pesticide or pesticide container, read the labeling to determine:

- how to decontaminate and dispose of the pesticide container
- where to dispose of excess pesticide.

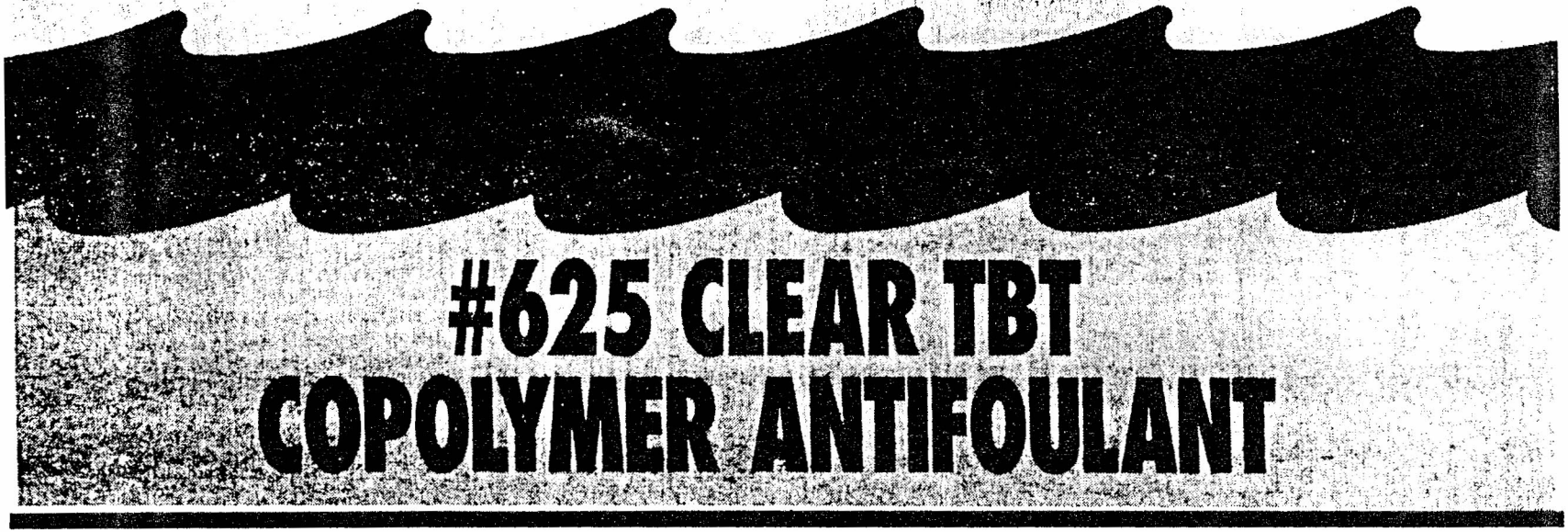
Pesticide labeling, regardless of the manufacturer or supplier, follows a similar format, e.g., see Attachment C, p. 23, which shows a generic label.

RESTRICTED USE PESTICIDE

Due to Toxicity to Aquatic Organisms Including Shellfish: For sale only to certified commercial applicators and for use only by certified commercial applicators or by persons under the direct supervision of an on-site (at the work site) certified commercial applicator.

Claude Yacht® Coatings

...a Tradition of Care.



#625 CLEAR TBT COPOLYMER ANTIFOULANT

DANGER:

KEEP OUT OF REACH OF CHILDREN

Net Contents: 1 U.S. Gallon/3.785 Liters

ACTIVE INGREDIENTS: Tributyltin Methacrylate (As a Part of a Polymer)	12.20%
INERT INGREDIENTS:	87.80%
	100.00%

EPA Registration No. 55363-5

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED — Drink a large quantity of water. Avoid alcohol. Get medical attention. Note to physicians: Probable mucosal damage may contraindicate the use of gastric lavage.

IF INHALED: — Remove to fresh air.

IF IN EYES: — Flush eyes with plenty of water. Get medical attention.

IF ON SKIN: — Wash with plenty of soap and water. Get medical attention. See back panel for additional precautionary statements.

Total Tin Content 3.91%
Contains Petroleum Distillates

EPA Establishment No. 55363-PA-001

DANGER:

PRECAUTIONARY STATEMENTS:

HAZARDS TO HUMANS AND DOMESTIC ANIMALS: Corrosive. Causes severe eye and skin damage. Harmful if absorbed through skin, swallowed or inhaled. Do not get on skin, in eyes or on clothing. Wear goggles, face shield or safety glasses. Wear protective clothing such as long sleeved cotton shirt, long pants, hat and gloves. Wash thoroughly with soapy water after handling. Remove contaminated clothing and wash before reuse. Avoid breathing vapor or spray mist. Use with adequate ventilation. When used in confined areas, while sanding boat surface, wear a mask or respirator jointly approved by the Mining Enforcement and Safety Administration and the National Institute for Occupational Safety and Health.

ENVIRONMENTAL HAZARDS: This pesticide is toxic to aquatic organisms including fish and shellfish.

PHYSICAL OR CHEMICAL HAZARD: FLAMMABLE: Do not use or store near heat or open flame. FLASH POINT 85° F.

DIRECTIONS FOR USE:

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. It is unlawful to use this product on nonaluminum hulled vessels less than 82 feet (25 meters) in length (on deck) except for the outboard motor or lower drive unit of such vessel. Users must comply with all applicable OSHA requirements. During and after paint removal and/or application of new TBT paint, methods must be employed which are designed to prevent release of TBT paints into the aquatic environment.

GENERAL INFORMATION:

CLASSIC YACHT Antifoulant is designed for use on below waterline surfaces only. Areas to be coated must be clean, dry and properly prepared to assure long-term adhesion and performance. Application may be by brush or roller.

Each application of CLASSIC YACHT Antifoulant or Primer must be dry before overcoating to assure proper appearance and surface smoothness. Lower temperatures or excessive film thickness require additional dry time.

MIXING: Stir by hand. Do not shake. **THINNING:** Not recommended; if necessary, use CLASSIC YACHT Thinner # 101 to achieve desired consistency. NOTE: Always apply recommended gallonage to assure required film build. **APPLICATION TEMPERATURE:** 55° - 90° F. **COVERAGE:** 250 sq. ft./gal. at 4.5 mils wet film thickness. **DRY TIME BETWEEN COATS:** 2 hours minimum. **DRY TIME BEFORE LAUNCH:** 12 hours minimum. **CLASSIC YACHT 200 SERIES BASE COAT:** 200 series provides color base for CLASSIC YACHT Clear Antifoulant and enhances adhesion and moisture resistance. Apply at 4 to 5 mils WFT – 250 sq. ft./gal. Allow 4 hours minimum dry time before overcoating.

APPLICATION PROCEDURES:

OVERCOATING PREVIOUSLY PAINTED HULLS (In Good Condition): Remove all barnacles, scum, loose or soft paint and foreign material by pressure washing, scraping, scrubbing with # 305 Prep Wash, or by sanding with #80 - 120 grit production paper. Sand down to a smooth surface. Remove all dust by wiping or washing. Apply one coat or 200 Series BASECOAT™ Primer in the color of choice. Note: When overcoating previously applied bottom paints, always apply the new antifoulant to a small test area to confirm compatibility with the old coating before proceeding. Apply three coats of # 625 Clear TBT Antifoulant over the primer allowing minimum of 2 hours dry time between coats.

OVERCOATING PREVIOUSLY PAINTED HULLS (In Poor Condition): Remove any loose and flaking paint to provide a sound surface. Sand any imperfections and fill with BLUEBOND™ 6A epoxy surfacing and fairing compound. Sand again and wipe clean. Apply one coat of 200 Series BASECOAT Primer; allow minimum of 4 hours dry time. Apply three coats of #625 Clear TBT Antifoulant over the primer.

ALUMINUM HULLS: Sandblast or slurry blast the surface to remove existing coating, fouling and oxidation. Hull should be blown clean with air to remove all grit and dust particles. Apply two coats of #905 Yachtshield Epoxy Barrier Coat. Refer to Tech Report #227 for application instructions. Overcoat with BASECOAT in the appropriate color. Allow at least 4 hours drying time. Apply three full coats of #625 Clear TBT Copolymer Antifoulant with 2 hours drying time in between coats. Allow a minimum of 12 hours drying time before launching. For application information on smaller vessels (jon boats, pontoon craft, etc.), refer to Tech Bulletin #221.

COATING BARE FIBERGLASS: Wash hull thoroughly with #305 Prep Wash, scrub brush, and water to remove all mold release, wax, etc. Then use FP-300 No Sanding Fiberglass Primer or frost sand the gel coat to remove gloss using #80 - 120 grit production paper and then wash hull again, using #305 Prep Wash, rinse and allow to dry. Application of one or two coats of 200 Series BASECOAT Primer will provide additional gel coat sealing and maximize adhesion of the antifoulant. If an epoxy barrier coat is desired for additional gel coat protection, apply two coats of #905 Yachtshield™ Epoxy Barrier Coat. Overcoat with 200 Series BASECOAT Primer. Allow primer to dry at least 4 hours. Apply three coats (minimum) of #625 Clear TBT Antifoulant, allowing 2 hours dry time between coats.

STORAGE AND DISPOSAL:

PESTICIDE DISPOSAL: Do not contaminate water, food or feed by storage or disposal. Paint chips, spent abrasives, and any other waste materials from removal of old paint must be disposed of in a sanitary landfill (or, if required by Federal, State or local regulations, handled as a hazardous waste). If possible, use all of the contents by application according to label instructions. Manage excess paint, rinsate, and other application wastes in accordance with Federal, State, and local requirements. Consult your State pesticide or Environmental control agency, nearest EPA Regional Office, or the RCRA/Superfund Hotline (800-424-9346) for waste disposal guidance.

CONTAINER DISPOSAL: Triple rinse container if intended for recycling or reconditioning. Empty paint containers with small amounts of dried residue must be disposed of in a sanitary landfill (or, if required by Federal, State or local regulations, handled as a hazardous waste).

ITW Philadelphia Resins

P.O. Box 309, Montgomeryville, Pennsylvania 18936 Telephone: (215)855-8450 Customer Service: (813)573-5223 FAX: (813)573-5227

ATTACHMENT C

Product Name

RESTRICTED USE PESTICIDE due to toxicity to aquatic organisms including shellfish: For sale only to certified commercial applicators and for use only by persons under the direct supervision of an on-site (at the work site) certified commercial applicator. These restrictions became effective on March 1, 1990.

Active Ingredients: Bis (tributyltin) Oxide	6.89%
Inert Ingredients:	93.11%
	100.00%

Equivalent to 2.21% Metallic Tin

Contains Petroleum Distillates

Keep Out of Reach of Children

DANGER

See side panel for precautionary statements

5 U.S. Gallons (18.925 Liters)
EPA Reg. No. 1234-5 EPA Est. No. 1234-XY-Z

For Use in Commercial Shipyards Only

Company Name
Company Address
Company or Emergency Telephone Number

PRECAUTIONARY STATEMENTS

DANGER

Hazard to Humans and Domestic Animals

Corrosive. Causes skin burns and eye irritation. Harmful if absorbed through the skin or inhaled. Do not get on skin, clothing or in eyes. May be a dermal sensitizer. Wear a face shield and rubber gloves when handling. Wear protective clothing, such as long-sleeved cotton shirt, long pants and hat. Use in a well-ventilated area. When used in confined areas or applied by spraying, wear protective clothing and a pesticide respirator jointly approved by the Mining Enforcement and Safety Administration and the National Institute for Occupational Safety and Health. May be fatal if swallowed. If

swallowed, promptly drink a large quantity of egg whites, gelatin solution or water. Avoid alcohol. Do not induce vomiting. Do not breathe vapors or spray mist.

Practical Treatment

In case of skin contact, remove contaminated clothing and immediately wash skin with soap and water. Get medical attention. Wash contaminated clothing before reuse. If inhaled, remove the fresh air. Use artificial respiration if breathing has stopped. Get medical attention. If swallowed, do not induce vomiting. This product contains petroleum distillates. Get medical attention. If in eyes, immediately flush with plenty of water. Get medical attention.

Environmental Hazards

This product is toxic to fish. Do not apply directly to water. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not allow chips and dust generated during paint removal to enter water. Dispose of paint debris in an approved landfill.

Chemical and Physical Hazards

Do not use or store near heat or open flame.

Directions for Use

It is a violation of federal law to use this product in a manner inconsistent with its labeling. It is unlawful to use this product on nonaluminum-hulled vessels less than 82 feet (25 meters) in length (on deck) except for the outboard motor or lower drive unit of such vessel.

Users must comply with all applicable OSHA requirements.

During and after paint removal and/or application of new TBT paints, methods must be employed which are designed to prevent release of TBT paints into the aquatic environment. Following removal of old TBT paint and/or application of new TBT paint, all paint chips and spent abrasives, paint containers, unused abrasives, paint containers, unused paint and any other waste products from paint removal or application must be disposed of in a solid-waste landfill.

Antifouling Paint - for application to underwater areas of steel, aluminum, fiberglass or wood vessels subject to fouling by barnacles, algae, tube worms and other fouling organisms. Surface to be coated should be clean of grease, oil, dirt and moisture. Do not apply directly to metal surfaces. Apply a spray, brush or roller. For spray, airless spray is strongly recommended. When spraying, applicators must use appropriate NIOSH - approved respirators. Protective clothing, rubber gloves and goggles should be worn by applicators. Contaminated clothing should be laundered before reuse. Clean up with solvent. Launching may be accomplished as soon as coating is dry, or later if desired.

Storage and Disposal

Do not contaminate water, food or feed by storage or disposal.

Pesticide Disposal - Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency, or the hazardous waste representative at the nearest EPA Regional Office for guidance.

Container Disposal - Dispose of empty containers in a solid-waste landfill or by other approved state and local procedures. Dispose of product that cannot be used in accordance with its labeling directions following federal, state or local procedures under the Resource Conservation and Recovery Act (RCRA).

Chapter 3
SAFETY

A. Objectives

After completing this chapter, you should know the:

- Difference between acute and chronic effects of overexposure to TBT paints.
- Common types of exposure and accidents that may be expected when using TBT paint.
- Precautions, protective clothing and equipment to avoid overexposure to TBT paint.
- Symptoms of overexposure/poisoning.
- Emergency procedures and practical treatment.

B. Discussion

1. Risk

The probability that exposure to a pesticide will cause an adverse health effect is called "risk." Risk depends on the length of exposure and the toxicity of the pesticide.

Risk increases as exposure or toxicity increases. The best way to reduce risk is to reduce exposure. To minimize the potential for employee or environmental exposure to TBT paint, follow these recommendations:

a. Keep airborne concentrations of TBT as far below the Permissible Exposure Limit (PEL) as possible.

b. Remove all nonessential personnel, equipment and materials from the spraying area.

c. Use airless spray equipment to minimize overspray and the potential for exposure.

2. Hazards

The following signs and symptoms may result from exposure to TBT paints. They are grouped according to exposure route.

a. **Eye contact** - May cause severe, immediate or delayed eye irritation. The onset of irritation may not occur until several hours after exposure.

b. **Skin contact** - May produce irritation or contact dermatitis which may be delayed several hours. Prompt and thorough washing with soap and water minimizes or eliminates potential dermal effects.

c. **Inhalation** - May irritate the upper respiratory tract. May also produce coughing, headache and nausea. The onset of these symptoms may be delayed for several hours after exposure.

d. **Oral toxicity** - May cause abdominal pain, vomiting, and liver or kidney disease.

3. Effects of overexposure

Overexposure to TBT paints can produce undesirable effects such as blistered skin, sore throat, coughing, vomiting, headache, dizziness, abdominal pain and urine retention. The certified applicator should have a working knowledge of how such effects are classified by persons who deal with poisonings.

Health effects are classified in various ways. For example, they can be classified by severity. Most people use this kind of classification and speak of "a very bad headache" or "a slight sore throat." However, persons who deal with poisonings generally classify overexposure effects somewhat differently. They use TIME as the basis for classification. Overexposure effects classified according to time rely upon two words: ACUTE and CHRONIC.

Acute effects are injuries or illnesses that appear immediately or soon (within 24 hours) after a person is exposed to a hazardous material. Formation or a blister soon after TBT paint is spilled on the skin an example of an acute effect. The size of the blister, or degree of skin damage, makes no difference. The blister is an acute effect because the blister appeared soon after the exposure occurred. In general, acute effects are reversible.

Chronic effects are illnesses or injuries that show up only after considerable time (usually years) has passed since exposure. In other words, they are long-term effects. Kidney or liver disorders that result from TBT poisoning would be examples or chronic effects.

4. Precautions

To avoid accidental ingestion or dermal exposure, wash before eating, drinking or using gum or tobacco products. Accidental ingestion can occur if the pesticide is mistaken for food or drink, accidentally contaminates food, or splashes into your mouth. To avoid accidental inhalation, wear proper respiratory protection while in or near spraying areas.

The following points summarize the principal safety precautions that should be observed by certified TBT applicators and persons working under their direct supervision:

a. Use a NIOSH/MSHA-approved respirator. For spray painters, full-coverage supplied-air hoods must be used. Workers must be trained in the proper use of respirators.

b. Wear protective clothing (disposable coveralls and shoe covers) and plastic or rubber gloves, and hoods. Shower with soap and water immediately after removing protective equipment contaminated with TBT paint.

c. Wear goggles and face shield to protect eyes from dust, mist or spray.

d. Avoid eating and drinking in work areas.

e. Avoid contact with TBT paint, overspray or contaminated sandblasting residue.

f. Monitor work site and workers regularly. g. Do not use TBT paint in ship's interior.

h. Do not have open flames or sparks near the spraying or storing of TBT paint.

i. Always follow any additional precautionary statements on the product label.

5. Exposure limits

Permissible Exposure Limit (PEL) (OSHA's designation for air-contaminant exposure) - For TBT products the PEL is 0.1 mg/m3 as tin for 8-hour time-weighted average.

6. In case of emergency

a. **Eyes** - Immediately flush eyes with flowing water for at least 15 minutes. Get medical attention.

b. **Skin** - Remove contaminated clothing and flush skin with water. Wash with soap and water. (Never use solvents to remove TBT paint from the skin.) Get medical attention.

c. **Inhalation** - Move exposed individual to fresh air. If not breathing, give mouth-to-mouth respiration. Get medical attention.

d. **Ingestion** - Promptly drink a large quantity of milk, egg whites, or gelatin solution; or, drink large quantities of water. Avoid alcohol. Do not induce vomiting. Get medical attention.

These emergency actions apply to TBT poisoning. TBT paint may also contain other hazardous ingredients. First-aid measures should be based on the pesticide label and labeling and the material safety data sheet. In case of an emergency involving an individual exposed to TBT, the pesticide label and material safety data sheet should be provided to medical professionals.

Chapter 4
STORAGE, HANDLING AND DISPOSAL

A. Objectives

After completing this chapter, you should know:

- How to store, transport, and handle TBT paints.
- The general guidelines for proper disposal of wastes from TBT paints.
- The general guidelines for disposal of paint chips and dust.
- The general guidelines for disposal of unused paint, contaminated equipment and paint containers.
- The practical measures for handling contaminated wash water.
- How to obtain specific information on state and local laws and regulations affecting disposal.

B. Discussion

1. Storage and handling of TBT paints

Storage and disposal must be done in accordance with a pesticide's label directions. Additional storage and handling precautions include the following:

a. Follow good warehouse practices; store paints in a cool, dry area.

b. Pesticides should be stored in their original containers. If the original container is unavailable, the pesticide should be stored in a fully labeled chemical-resistant container.

c. Never store pesticides in food or drink containers.

d. Pesticides should be stored away from food, feed, seed, humans and animals.

e. Do not contaminate water, food or feed by storage or disposal methods.

f. Pesticides should be stored in fully closed containers.

g. Store in a secure area to prevent access by unauthorized persons. Post warning signs on all entry points.

h. Transportation, mixing, and handling of restricted use pesticides must be done by or under direct supervision of a certified applicator.

2. Disposal of TBT paint wastes

General directions are provided on the labels of all TBT paints. For pesticides, "the label is the law," and it is a violation of federal law to dispose of any pesticide, including a TBT paint, in a manner inconsistent with its labeling.

The following statements are on the product label, under "Storage and Disposal:"

Paint chips, spent abrasives and any other waste materials from removal of old paint must be disposed of in a solid-waste landfill or, if required by federal, state or local regulations, handled as hazardous waste

If possible, use all container contents by application according to label instructions. Manage excess paint, rinsate, and other application wastes in accordance with federal, state and local requirements Consult your state pesticide or environmental control agency, nearest EPA regional office, or the RCRA/Superfund Hotline (1-800-424-9346) for waste disposal guidance

Triple rinse container if intended for recycling or reconditioning Empty paint containers with small amounts of dried residue must be disposed of in a solid-waste landfill or, if required by federal, state or local regulations, handled as a hazardous waste

a. **Paint wastes as hazardous wastes** - TBT paints contain solvents which can catch fire. Wastes containing highly ignitable solvents are considered hazardous wastes under federal regulations. Federal, and in some cases state or local, laws dictate proper disposal methods for hazardous wastes. In general, hazardous wastes cannot be taken to a solid-waste landfill. Materials which may be considered hazardous wastes include excess liquid paint, rinsate, used chemical paint removers, and rags and brushes wet with liquid paint.

Some states have exemptions for businesses that generate only small amounts of hazardous wastes. To find out how state and local laws apply to your TBT paint wastes, you should get specific advice from your state hazardous-waste agency. In Georgia contact: Environmental Protection Division (EPD), Generators Compliance Unit, 4244 International Parkway, Suite 104, Atlanta, Ga. (404/362-2684), or Georgia Tech Research Institute, Hazardous Waste Technical Assistance Program, (404) 894-3806. Georgia Tech is your best source. When seeking information from these sources, have the paint label or material safety data sheet available.

In Georgia, supplies of TBT paints that cannot be used according to label directions, are outdated or solidified, must be disposed of as hazardous waste. Contact EPD's Generator Compliance Unit or Georgia Tech's Research Institute (see above) for disposal instructions.

b. **Dry wastes** - Once the solvents in your TBT paint evaporate, ignitability lessens greatly. Under federal regulations, TBT paints from which the solvents have dissipated are not considered hazardous waste, although they may require special disposal methods under state or local law. That is why it is imperative that you be familiar with state and local laws and how they apply to the paints you use. Wastes that do not contain hazardous solvents include paint scraped from boat bottoms, spent abrasives mixed with dry paint, and cans with dried residues. Although these are not considered hazardous wastes, they still contain TBT in amounts potentially harmful to the marine environment. These materials, therefore, must be disposed of in a solid-waste landfill, where they will not leach or return to the water.

To catch paint chippings and spent abrasives, place a tarpaulin or plastic under the section of the vessel being worked on. The tarp or plastic can then be swept or rolled up and discarded. Sweepings should be removed carefully for solid-waste landfill disposal. TBT paint removal producing a fine dust should be done indoors protected from wind, or outdoors when there is little wind.

> "During and after paint removal and/or application of new TBT paint, methods must be employed which are designed to prevent release of TBT paints into the aquatic environment. Following removal of old TBT paint and/or application of new TBT paint, all paint chips and spent abrasives, paint containers, unused paint, and any other waste products from paint removal or application must be disposed of in a sanitary landfill". (*Federal Register, Part III, Environmental Protection Agency, Vol. 53, No. 192, Oct. 4, 1988*).

c. **High pressure water** - If old TBT paint is removed from the vessel hull by power washing or high pressure water, there will be particles of the old paint in the wash water. These particles must be kept out of any river, bay or other body of water. There are a number of techniques for treatment of the wash water to remove the paint particles. The simplest is filtering. Materials such as hay, straw, gravel or polypropylene are installed in discharge troughs, scuppers or drainage pits to catch paint chips as the water flows back to the source.

These principles can be applied to existing systems, although some boat yards have installed sediment traps in their vessel-maintenance areas to remove paint waste from wash water.

d. **Containers** - Although the label refers to container rinsing for recycling or reconditioning, very few paint cans are reused. In fact, if you rinse cans with a solvent to remove leftover paint, you may actually be creating more hazardous waste. If a can contains unusable paint, it may be easier to store and dispose of it with other hazardous wastes. Be sure that you follow appropriate disposal methods for your state or locality. An empty paint may be disposed of in an approved solid-waste landfill or by other approved state and local procedures. Open burning and dumping are prohibited.

e. **equipment and vessel - maintenance areas** - Carefully clean clothing and equipment used during the application or removal of TBT paints according to manufacturer's instructions or dispose of according to federal, state and local laws. Contaminated waste water and solvents from the cleaning process must be disposed of in accordance with these laws and the Clean Water Act.

Dry-dock and equipment surfaces should be swept or vacuumed to gather overspray and other paint waste, such as chips, dust and sand-blasting grit for disposal. These wastes and any equipment that cannot be economically cleaned, should be disposed of in accordance with local, state and federal requirements under RCRA and FIFRA.

3. Spillage

Have a suitable absorbent available for accidental paint spillage in the work area. Used absorbent must be disposed of according to federal, state and local laws and regulations.

To collect waste materials and control spills, use protective coverings (plastic, canvas, etc.) in the immediate work area. Contain paint spills by covering the spill area with absorbent materials such as sand, kitty litter or pads. Keep the containment area as small as possible. Use a shovel or rake to construct a dam of soil or sod. If the spilled material flows into a ditch or depression, block all sides to reduce further movement. Important: Don't allow the spilled material to enter any body of water. After containing the spill, collect, and dispose of the contaminated absorbent and soil according to local, state and federal requirements.

Chapter 5
ENVIRONMENT

A. Objectives

After completing this module, you should know

- Reasons for restrictions on TBT paint.
- Effect of TBT paint on nontarget organisms.
- Concepts of spill management.

B. Discussion

1. Reasons for restrictions

TBT paints work by releasing a toxicant, at a rate high enough to repel or kill organisms, from the coated surface. TBT is toxic to fish, oysters and other bivalves, snails and other gastropods, crustaceans and algae. The extent of TBT contamination is determined by water monitoring.

Areas containing significant TBT levels are primarily concentrated in harbors, marinas and drydock facilities. The environmental significance of TBT contamination is that these areas coincide with estuaries and other habitats that support fisheries populations.

In 1988, the Organotin Antifouling Paint Control Act (OAPCA) was enacted. This legislation prohibits the use of TBT paints with high release rates. "Release rate" refers to the rate TBT is released from the paint. The maximum legal release rate is 4 micrograms per square centimeter of painted surface per day. OAPCA law also prohibits the use of TBT products on vessels less than 82 feet except for those with aluminum hulls. These are excluded because of corrosion which can occur if aluminum is painted with copper-based paints; presently TBT is the only alternative antifoulant.

In October 1988, after a two-year special review of TBT paints, EPA determined that certain TBT uses may adversely affect aquatic environments. As a result, EPA classified TBT paints as restricted use pesticides. To reduce the risk of inadvertent aquatic contamination, EPA requires TBT applicators to be properly trained, and certified.

2. Effect of TBT paint on nontarget organisms

TBT penetrates the body membranes of aquatic organisms. Aquatic organisms also ingest TBT contaminated food. This exposure produces two types of toxic effects.

a. **Acute effects** - organisms are killed after an exposure of less than one week.

b. **Chronic effects** - long-term exposures affecting growth, reproduction and other physiological processes.

Young aquatic organisms (from fertilized-egg through larval stages) are usually extremely sensitive to TBT.

3. Concepts of spill management

Apply and dispose of TBT paint in accordance with label directions. Minimize contact with aquatic life, soil and water, and avoid contamination which could result in damage to non-target organisms. Climatic factors (such as wind and rain) and work-site factors (such as terrain, drainage and soil) increase the potential of environmental harm from a spill, leak or runoff.

To minimize risks to nontarget animal species and the environment, obey the following procedures:

- Use floor coverings.
- Have adequate containment areas.
- Provide sufficient absorbent material at the work site.
- Collect used wiping materials, waste paint, empty cans and other contaminated materials and dispose in accordance with federal, state and local laws and regulations.
- Prevent spills from reaching water.
- Do not flush out the dock with water to remove spills and scraped paint.
- Ensure that wind conditions do not cause overspray or sanded or scraped material to drift into dockside areas and adjacent waters.

Chapter 6
PESTS AND PESTICIDAL PROPERTIES

A. Objectives

After completing this chapter, you know should know the:

- Purposes of antifouling paints.
- Groups of marine organisms controlled by antifouling paints.
- Mechanism of antifouling paints.
- TBT compounds used in antifouling paints.
- Categories of TBT paints and factors that affect their performance.

B. Discussion

1. Purposes of antifouling paint

The growth of aquatic organisms on hulls of ships and other structures submerged in sea water is referred to as "fouling." Fouling on a ship's hull decreases the speed and increases fuel consumption. Fouling also increases the weight of buoys and other navigational equipment, interferes with underwater sound devices, clogs underwater pipes and corrodes underwater surfaces.

2. Marine fouling organisms

The Woods Hole Oceanographic Institution lists about 2000 species of marine plants and animals as fouling organisms. Marine animals include bacteria and diatoms that form a slime film. Plants, such as algae and seaweed, can form large colonies. Other animals include barnacles, mussels, bryazoans, hydroids, tunicates and tube worms. Every member contributes to the development of the fouling community.

3. Definitions

The term "pesticide" means any substance or mixture of substances intended for preventing, destroying, repelling or mitigating a pest. There are different types of pesticides formulated for different classes of pests. The following are examples of classes of pesticides.

Herbicide - Kills or inhibits plant growth.

Fungicide - Kills, prevents or inhibits fungi growth.

Insecticide - Kills, prevents or inhibits the establishment, reproduction, development or growth of insects and allied organisms.

Nematicide - Kills, prevents or inhibits multiplication or establishment of nematodes.

Invertebrate animal poisons and repellents - Kill, prevent establishment, repel or mitigate invertebrate pest animals. This category includes antifouling paints.

4. Antifouling agents

In the early 1950s, compounds of copper, mercury and arsenic were the primary antifouling agents. These compounds were incorporated in paint and controlled fouling organisms by leaching from the paint film when immersed in sea water. Federal and state regulations have eliminated mercury and arsenic as antifouling agents in the U.S.

Organotin (TBT) compounds were first evaluated as antifouling agents in the 1950s and 1960s. They were rapidly accepted and used by the paint industry because they:

a. Exhibit no galvanic corrosion, which occurs when dissimilar metals (such as an aluminum hull painted with a copper-base paint) are in contact with each other and sea water.

b. Have a wide range of biological activity.

c. Have a lower mammalian toxicity than organic mercury and arsenic compounds.

d. Require lower doses of active ingredient than copper compounds for effective fouling control.

The most commonly used organotins for antifouling paint are in the TBT family. Some triphenyltin formulations are also used. Organotin copolymers were first developed in the 1960s but it was not until the 1970s that their superior antifouling properties were recognized and they were fully marketed.

5. Paint properties

The properties required for satisfactory performance of antifouling paints include release rate, durability, and adhesion. The paint should be easy to apply, dry or harden in a relatively short time and have good film build (desired film thickness obtained with two to four coats of paint).

Sufficient levels of active ingredients should be released slowly to provide fouling control for as long as possible. In addition, properly applied paint should not adversely affect human health, safety or the environment.

6. Mechanism

The principal function of an antifouling paint is to interrupt the life cycle of marine organisms by preventing or eliminating their settlement and growth. TBT paints

release TBT to disrupt the early life stages of the fouling organisms, preventing them from anchoring and growing on the protected surface.

The release rates of TBT paints into sea water depend on the formulation and the environment.

Differences in berthing locations, operating schedules, length of service, condition of paint film surface, temperature, pH and salinity affect performance of antifouling paints.

7. Formulations and categories

TBT paint can have a single TBT active ingredient can contain two or more TBT compounds, or, may contain TBT combined with copper compounds. TBT compounds registered for use as antifoulants are bis(tributyltin) oxide, tributyltin fluoride, and tributyltin methacrylate. Depending on the specific formulation, these paints cover from 150 to 400 square feet per gallon.

TBT paints may be classified in three categories according to the way the TBT component is incorporated into the paint coatings and subsequently released.

Free-association paints - In these conventional coatings, TBT is physically incorporated into the paint matrix. TBT leaches from the paint surface by diffusion when immersed in sea water. The film does not dissolve or slough away, sea water so that the level of TBT leached out decreases with time.

Copolymer paints - The TBT component is chemically bonded to a polymer (resin molecules which consist of structural units repeated a number of times). The active ingredient is released by the action of sea water on the TBT bond. These paints are characterized by slow dissolution from ship hulls and thus achieve a constant but prolonged release of antifoulant. A micro layer of hydrolyzed polymer is polished away as the ship moves through the water. Service life depends on the dry film thickness (number of coats applied).

Ablative paints - These paints have characteristics of both the free association and copolymer paints. TBT is not bound to a polymer, but is incorporated into the paint matrix. Ablative paints are soft paint films that are slightly water soluble so that the surface slowly sloughs (or ablates) as the painted vessel moves through the water. This exposes a fresh layer of antifouling paint and prevents the buildup of insoluble materials. These paints are specifically formulated and should be applied according to the manufacturer's instructions to achieve optimum effectiveness. Because the paint's effectiveness is directly proportional to the amount used, it is important that the paints be applied evenly.

Chapter 7
APPLICATION TECHNIQUES

A. Objectives

After completing this chapter, you should know:

- The different methods of application.
- How to clean and maintain spray equipment.
- The proper personal protective equipment to wear while applying antifouling paint.
- Paint-spill management techniques.

B. Discussion

Paint is not a finished product until it has been applied to the substrate. Proper application, therefore, is a critical part of painting. High performance coating systems are especially sensitive to misapplication.

The application techniques described in this section minimize the potential hazards from the use of TBT paints. These procedures are similar to the techniques for other antifoulants and coatings applied in shipyards and dry docks. The primary difference between working with TBT paints and conventional coatings is that TBT paints are restricted use pesticides. TBT paint requires different safety precautions and cleanup procedures. Knowledge of special application practices for TBT paints is essential for protecting applicators and the environment.

1. Paint preparation

TBT paints are typically proprietary and should be used only over the manufacturer's recommended anticorrosion coating system. Proprietary solvents and other materials may be required by the manufacturer. Paint preparation must follow the manufacturer's specifications.

To make the paint homogenous and uniform, stir to dispense any supernatant liquid and remove all skins, lumps and large particles. Multiple component paints must be carefully mixed just before use.

2. Literature

Before opening and using a TBT paint container, carefully read the entire label, the manufacturer's pesticide data sheet and material safety data sheets. The labeling may also refer to compliance with OSHA regulations and directions for TBT application, removal and disposal to reduce the introduction of TBT paint wastes into the aquatic environment. Ask your supervisor or contact the paint supplier if you have questions.

3. Preparation for application

Surface preparation is the same for both TBT and conventional paints. Always follow the directions on the pesticide label. In addition, follow the procedures listed below:

a. Keep all cans, pails and drums tightly closed when not in use. Protect containers with barriers to prevent damage by vehicles or other equipment, or place containers safely away from these.

b. Transfer the contents of leaking cans, pails or drums to suitable containers. Use sand or sawdust to absorb spills. Put original label or facsimile on containers to which pesticides have been transferred.

c. Place warning signs in and around areas where TBT paints are use. Require personal protective equipment.

d. Use protective coverings in work areas where TBT paints are used.

In the case of a TBT paint spill, apply an absorbent to the spill area. Contain the spill to keep it from spreading. Use a hand tool such as a shovel or rake to construct a dam of soil or sod. If the spilled material flows into a ditch or depression, block all sides to reduce further movement. IMPORTANT: DO NOT ALLOW SPILLS TO ENTER ANY BODY OF WATER. Collect and dispose of contaminated absorbents according to local, state and federal requirements.

e. Allow only protected personnel in TBT paint application areas.

f. Remove all unnecessary equipment from the immediate application area so it cannot be contaminated by overspray. Cover all equipment with tarpaulins. Do not allow the liquid paint to contaminate the equipment.

g. Use screens and canopies to prevent overspray from reaching areas not to be painted; position screens and canopies to contain overspray.

h. Install emergency eye washes and showers at TBT mixing and application areas.

i. Be sure to prevent overspray from drifting to dockside areas and adjacent waters.

4. Protective equipment

a. Use disposable coveralls and shoe covers, and plastic or rubber gloves. All personnel within a 25-foot radius of spray painting must wear full-coverage supplied-air hoods. Tape protective clothing at the wrists, ankles and

zippers. Discarded disposable items should be accumulated in a closed container and disposed of in a solid-waste landfill or by other approved state or local procedures.

b. All persons working within a 10-foot radius of TBT mixing, handling and cleanup areas must wear hoods and disposable coveralls and shoe covers. Tape protective clothing at the wrists, ankles and zippers. The paint-mixing area shall not be located downwind of the spraying area. For non-disposable clothing, follow these rules:

- Wear clean clothing daily. If clothing gets wet, change it immediately.
- Do not store or wash contaminated clothing with other laundry.
- Wash gloves daily, inside and out, and hang them to dry.
- Test gloves for leaks by filling with water and gently squeezing. Discard damaged gloves.
- Wash goggles or face shields daily.

c. Personnel entering the dry dock during TBT application, but remaining beyond the specified work area distances, must wear protective eye wear and respirators, as specified by posted signs or the safety engineer.

d. Spray painters, mixing personnel, handlers, cleaners, and brush or roller painters inside the TBT paint work area exposure zone must wear approved, supplied air hoods. Only NIOSH/ MSHA-approved respirators shall be used. Painters' respirator air lines shall be covered with disposable sleeves.

5. Application

a. When practical, apply TBT paints with airless spray equipment. Touch up with brush or roller. See pictures of application equipment at the end of this module.

b. Do not perform work that produces flames or sparks within 35 feet of the work area during TBT application.

c. Carefully follow all application instructions provided on the label, the pesticide data sheets, and the material safety data sheets of the manufacturer. In particular, use the specified amount and type of thinner during mixing. Follow the spray equipment guidelines for type of pump, type and length of hoses, pressure, tip size and fan width.

d. Maintain the distance between the spray tip and the surface to be painted such that a full wet layer of paint is applied with no overspray or dry spray. Apply each coating at the wet film thickness recommended by the paint manufacturer. As the job progresses, measure the film thickness with a wet film thickness gauge.

e. When spraying, keep the gun perpendicular to the surface and make parallel passes. Avoid spraying at angles less than 45 degrees. The maximum allowable angle will differ with wind conditions in the dry dock.

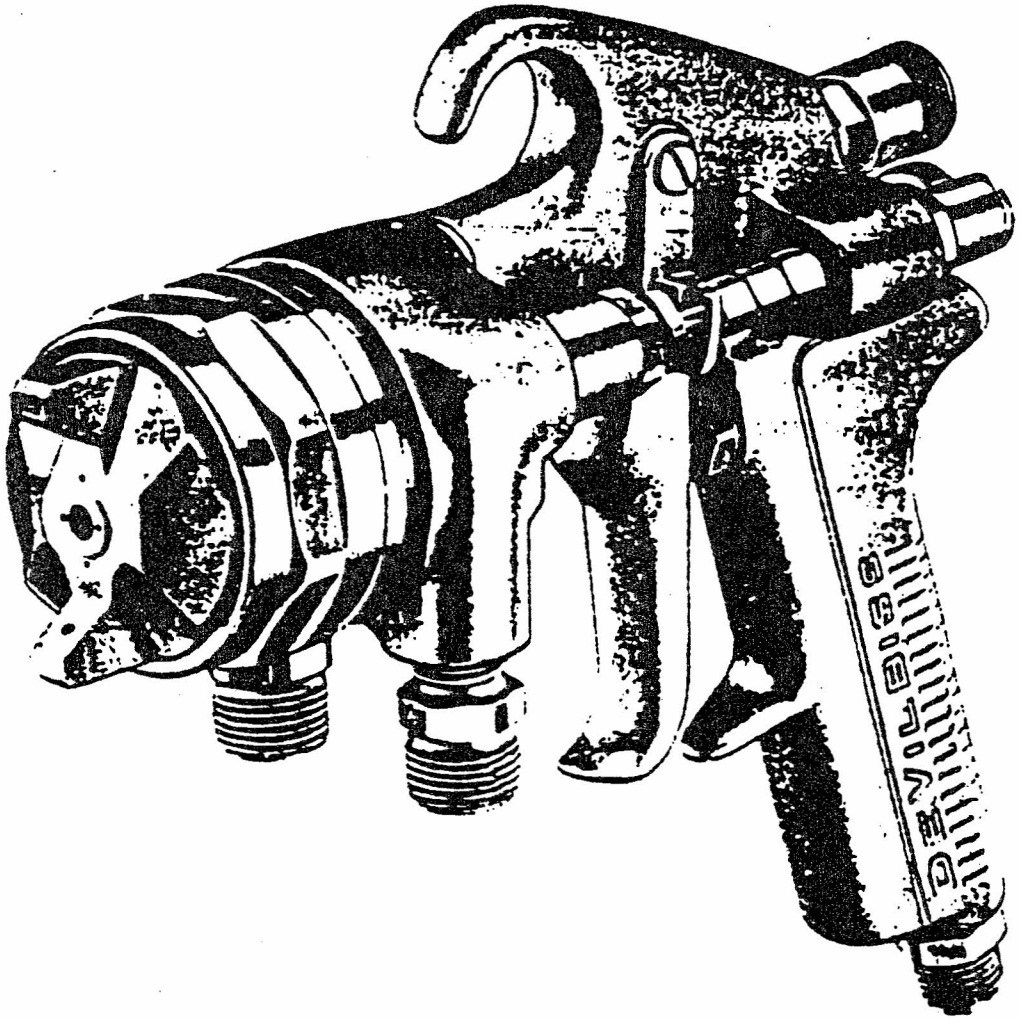
f. Release the trigger in time to end the pass without overspray. When starting a new pass, do not pull the trigger before the correct angle is reached.

g. Clean tip, gun, hoses and pump with the specified cleaning thinner. During cleaning use the same protective equipment used for spraying. Used cleaning thinner has to be treated as TBT waste and properly disposed of by approved state or local procedures. Spray equipment should be flushed with solvent which is then handled in accordance with RCRA procedures.

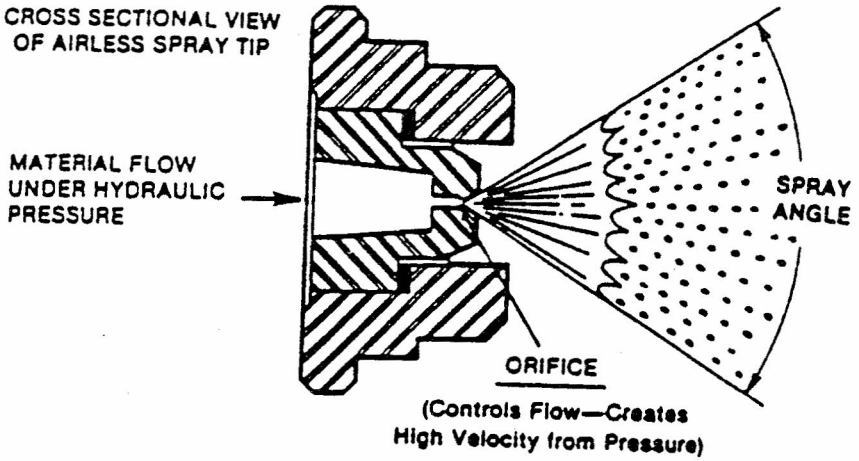
h. After application, clean all contaminated equipment, tools, tarpaulins and coverings; or dispose of them in a solid-waste landfill.

i. Do not flush out the dock to remove spills because this may cause adverse effects on the environment.

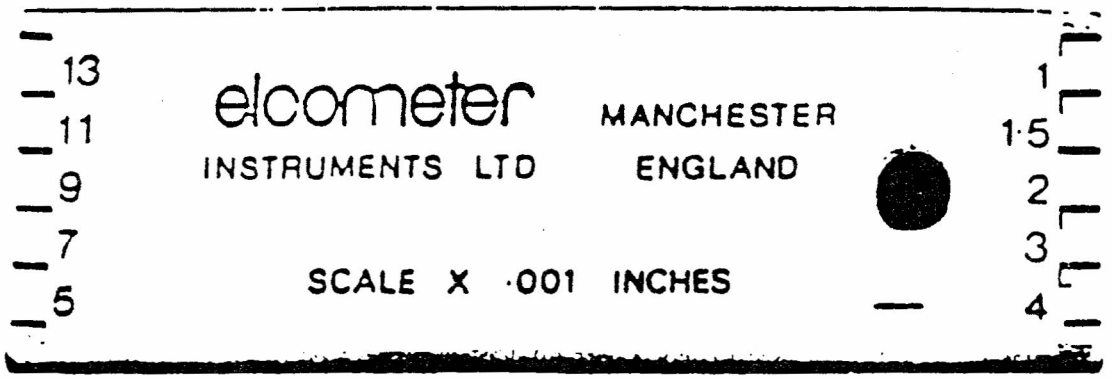
j. For small spills occurring during TBT paint application, immediately apply absorbent material to the spill area. For large spills (more than one gallon of paint) contain spilled material. Keep others out of the spill area. As a spill-protection measure, place a disposable drop cloth or plastic sheeting impermeable to the paint under each open paint container.



Two-Component Internal Mix Spray Gun
Courtesy of DeVillbiss Company



Airless Spray Action
Courtesy of the Aro Corporation



Wet Film Thickness Gage
Courtesy of Gardner Laboratory, Inc.