



BOATBUILDER'S HANDBOOK

[REVISED NOVEMBER, 2003]



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PART 3

Revised November, 2003

U.S. Coast Guard Consumer Fact Sheets #13 and #14

NOTICE:

It is the responsibility of the Boat Manufacturer to ensure that the applicable Federal Regulations have not been updated since the reference date. The U.S. Coast Guard, Office of Boating Safety website (<http://www.uscgboating.org>) contains an index and links to current recreational Boat Manufacturing Federal Regulations for reference.

U.S. Department
of Transportation

**United States
Coast Guard**

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2100 Second Street
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CONSUMER FACT SHEETS

FACT SHEET 13

Updated: Nov. 98

MARINE SANITATION DEVICES ON RECREATIONAL BOATS

Recreational boats are not required to be equipped with a toilet. However, the Clean Water Act requires that if a toilet is installed, it must be equipped with an operable Marine Sanitation Device (MSD) that is certified by the Coast Guard. Installed toilets that are not equipped with an MSD, and that discharge raw sewage directly over the side, are illegal.

Portable toilets or "porta-potties" are not considered installed toilets and are not subject to the MSD regulations. But they are subject to disposal regulations which prohibit the disposal of raw sewage within territorial waters (3 mile limit), the Great Lakes, or navigable rivers.

BASIC REQUIREMENTS

Vessels 65 feet in length and under may install a Type I, II, or III Marine Sanitation Device. Vessels over 65 feet in length must install a Type II or III MSD.

MSD TYPES

TYPE I. This device is certified to treat the sewage with disinfectant chemicals, and by other means, before it is discharged into the water. The treated discharge must meet certain health standards for bacteria content and must not show any visible floating solids.

TYPE II. This MSD is also a treatment device, but it is certified to provide a higher level of sewage treatment. Because it is larger in size than a Type I, and generally has higher power requirements, it is usually installed only in larger recreational boats.

TYPE III. This MSD does not allow the discharge of sewage. Type III category devices include recirculating and incinerating MSDs and holding tanks. Holding tanks are probably the most common kind of Type III MSD used on recreational boats. Sewage is stored in the holding tank until it can be pumped out to a reception facility on shore, or at sea beyond the territorial waters of the United States.

RECEPTION FACILITIES AND DECK FITTINGS

Reception facilities (sometimes called pumpout stations) are not required by Coast Guard regulations. Their availability at marinas or other locations is largely a function of local boater demand. Most cruising guides and boating almanacs list the availability of pumpout stations. However, because of the growing number of No Discharge Zones (see below) and the increasing number of boaters, the Federal Government and the

States are encouraging, and assisting with funding, the installation of more pumpout stations along U.S. waterways. They are also turning their attention to a requirement for standardized MSD pumpout fittings that will make it possible for all vessels to easily use any pumpout station.

For the future -- The Clean Vessel Act of 1992 (Public Law 102- 587, Subtitle F) recommends the following: "For all vessels manufactured after December 31, 1994, a standard deck fitting for removal of sewage should be constructed to the "International standard ISO 4567 Shipbuilding - Yachts - Waste water fittings" for holding tanks, which is a female 38.1 mm (1 1/2") pipe size with 11 threads per 25.4 mm (inch). These threads could utilize a quick-connect, or cam lock fitting. For existing vessels, an adapter, such as a tapered cone, should be used for non-standard deck fittings. All pumpout connectors should fit the standard deck fitting. For vessels manufactured after December 31, 1994, it has been recommended that, because of possible confusion between waste, fuel and water deck fittings, the deck fittings should be identified with the words 'WASTE', 'GAS', 'DIESEL', and 'WATER', and color coded. Fittings should be provided with black caps for waste, red caps for gas and diesel, and blue caps for water."

In the meantime, because there are a variety of fitting sizes at various marinas, boaters should acquaint themselves with what, if any, fitting adapter they should have to enable discharge at any pumpout location.

CERTIFICATION LABELS

Every manufacturer of Coast Guard certified treatment MSDs must affix a certification label on the MSD. The label will show the name of the manufacturer, the name and model number of the device, the month and year of manufacturer, the MSD type (i.e. Type I, Type I, or Type III), a certification number, and a certification statement. This is proof that the device has been tested to meet the U.S. Coast Guard regulations for design and construction, and the Environmental Protection Agency regulations and standards as required by the Clean Water Act.

Holding tanks (Type III MSDS) will not be labeled. They will be considered Coast Guard certified if they are used to store sewage and flushwater only and they operate at ambient (outside) air temperature and pressure. A holding tank must have enough reserve capacity to retain the wastes generated while the vessel is operating in waters where the discharge of raw sewage is prohibited. Isolating the overboard discharge piping from the head with a valve is not considered equivalent to providing a holding tank.

NO DISCHARGE ZONES

A boat can be equipped with any type of MSD permitted under the regulations. However, whenever a vessel equipped with a Type I or Type II MSD (these types discharge treated sewage) is operating in an area of water that has been declared a No Discharge Zone, the MSD cannot be used and must be secured to prevent discharge. No Discharge Zones are areas of water that require greater environmental protection and where even the discharge of treated sewage could be harmful. When operating in a No Discharge Zone, a Type I or Type II MSD must be secured in some way to prevent discharge. Closing the seacock and padlocking, using a non-releasable wire-tie, or removing the seacock handle would be sufficient. Locking the door to the head with a padlock or a door handle key lock is another acceptable method of securing the MSD while in a No Discharge Zone.

Generally, all freshwater lakes (and similar freshwater impoundments or reservoirs that have no navigable connections with other bodies of water), and rivers not capable of interstate vessel traffic, are by definition considered No Discharge Zones.

In addition, States may (with the specific approval of the U.S. Environmental Protection Agency) establish No Discharge Zones in other waters within the State. Boaters should check with their State Boating Law authority for more specific information on the location and limits of No Discharge Zones. States are empowered to set and enforce further restrictions for pollution control in their own waters. You can locate

your State Boating Law Administrator, by calling the toll-free U. S. Coast Guard Infoline -- 1-800-368-5647.

DISCHARGE OF RAW SEWAGE

It is illegal to discharge raw sewage from a vessel in territorial waters (within the 3 mile limit), the Great Lakes, and navigable rivers. However, a valve may be installed on any MSD to provide for the direct discharge of raw sewage when the vessel is outside U.S. territorial waters. The valve must be secured in a closed position while operating in U.S. waters. As described under NO DISCHARGE ZONES, use of a padlock, non-releasable wire-tie, or the removal of the valve handle would be considered adequate securing of the device. The method chosen must be one that presents a physical barrier to the use of the valve.

NOTE: The boundaries of U.S. territorial waters are marked on some nautical charts.

SPECIAL MSD RULES MAY AFFECT HOUSEBOATS

The Clean Water Act permits a State to enforce regulations regarding the design, manufacture, installation, and use of MSDs on houseboats, even if such a regulation is more stringent than Federal standards. "Houseboat" is defined as a vessel which, for a period of time determined by the State in which the vessel is located, is used primarily as a residence and not primarily as a means of transportation. If you own or operate a boat that fits this definition, check with the State Boating Law Administrator for any special MSD requirements the State may have.

MSD MALFUNCTIONS

The Coast Guard is interested in all complaints about faulty MSDs. Such complaints should be addressed to: Commandant (G-MSE-3)
U.S. Coast Guard Headquarters
Washington, DC 20593-0001
(202) 267-2206

Complaints should be specific in nature, describe in detail the problem encountered, and should also include the name of the device manufacturer, the certification number, the type of vessel the MSD is installed on, when it was installed, and what the maintenance schedule is for the MSD.

HOW TO REPORT AN ILLEGAL DISCHARGE

If you observe any boat not complying with these regulations regarding water pollution, report it to the nearest Coast Guard Marine Safety Office (MSO). To locate the MSO near you, call the toll free U. S. Coast Guard Infoline -- 1-800-368 5647.

Or you may report it to the National Response Center 1-800-424-8802 (In Washington, DC area call (202) 267-2675.)



U.S. Coast Guard

Infoline

- *To Report Possible Safety Defects in Boats*
- *For Boating Safety Recall Information*
- *For Answers to Boating Safety Questions*
- *To Comment on USCG Boarding Procedures*

• *Call, Toll Free!*

800-368-5647

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CONSUMER FACT SHEETS

FACT SHEET 14
Updated: March 99

A CONSUMER'S GUIDE TO THE COAST GUARD BOATING SAFETY STANDARDS

This Fact Sheet explains the basic purpose and content of the Coast Guard's Boating Safety Standards, The Boating Safety Standards are regulations that apply to the manufacture of many kinds of recreational boats. Generally speaking, the standards cover various safety aspects of boat or engine performance.

There are several ways that boat owners can benefit from having a basic understanding of the Coast Guard safety standards:

The boat owner or operator can make the most intelligent use of the safety features designed into the boat or engine.

The boat owner can avoid undoing or defeating many of the safety features when performing boat maintenance, particularly when replacing parts.

The boat owner can recognize a boat or engine which does not comply with a standard.

Each standard is discussed with a brief explanation of the boats to which the standard applies and when the standard went into effect. The reader can also use the table below as a general guide as to which standards apply to most boats.

	LESS THAN 20 FT IN LENGTH			20 FT OR MORE IN LENGTH	
	Rowboats	Outboard	Inboards & Sterndrives	Outboards	Inboards & Sterndrives
CERTIFICATION LABEL	X	X	X	X	X
DISPLAY OF CAPACITY INFO	X	X	X		
SAFE LOADING	X	X	X		
SAFE POWERING		X			
BASIC FLOTATION			X		
LEVEL FLOTATION	X	X			
ELECTRICAL SYSTEM (GAS)			X		X
FUEL SYSTEM (GAS)			X		X
VENTILATION (GAS)		X	X	X	X
HIN ALL BOATS MUST HAVE A HULL IDENTIFICATION NUMBER					

Notes:

Canoes, kayaks and inflatable boats are excepted from all boating safety standards; however, they are subject to the requirements for a Hull Identification Number.

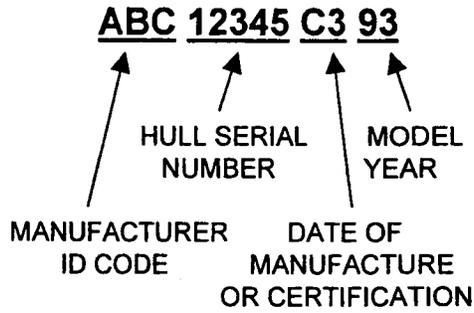
Generally, sailboats are excepted from the boating safety standards unless they have an inboard gasoline engine, a permanently installed gasoline generator or a fuel tank installed or carried in a compartment. Owners of such sailboats are referred to the discussion of the Fuel, Electrical and Ventilation Standards.

Outboard powered boats may be subject to the Ventilation Standard if they carry a fuel tank in an enclosed compartment

Table 1 - Applicability of the Various Boating Safety Standards

HULL IDENTIFICATION NUMBERS:

All boats manufactured or imported on or after November 1, 1972 must bear a Hull Identification Number (HIN). The HIN is a 12 character serial number that uniquely identifies your boat. The HIN has an important safety purpose. It enables manufacturers to clearly identify for boat owners the boats that are involved in a defect notification and recall campaign. A HIN is not the same as a State registration number,



KEY TO MONTH OF MANUFACTURE OR CERTIFICATION

JAN	A	JUL	G
FEB	B	AUG	H
MAR	C	SEP	I
APR	D	OCT	J
MAY	E	NOV	K
JUN	F	DEC	L

Figure 2 - HIN Format After August 1, 1984

Boats manufactured or imported on or after August 1, 1984, also have a duplicate secondary HIN affixed somewhere on an unexposed location inside the boat or beneath a fitting or item of hardware. The purpose is to help authorities identify your boat if a thief or vandals remove or damage the primary HIN on the transom. It is illegal for anyone (manufacturer, dealer, distributor, or owner) to alter or remove a HIN without the express written authorization of the Commandant, U.S. Coast Guard.

The regulations prescribe the format of the HIN. The first three characters are a MIC (Manufacturer Identification Code) assigned by the Coast Guard to the manufacturer or the person importing the boat; characters four through eight are a serial number assigned by the manufacturer; the last four characters indicate the month and year the boat was built, and the model year. Prior to August 1, 1984, the manufacturer had the option of expressing this in the form of a model year designation. See illustrations on next page.

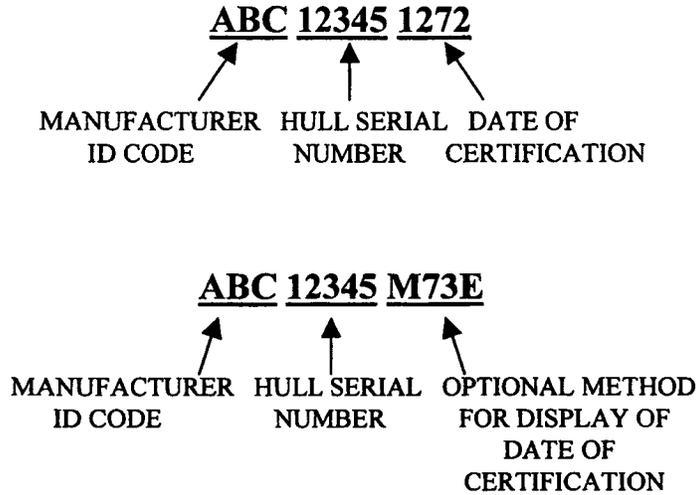
Individuals building boats for their own use and not for the purposes of sale are what are referred to as "backyard boat builders". They must obtain a 12 character Hull Identification Number number from their State boating agency. The Manufacturer Identification Code at the beginning of the HIN for a "home-built" boat is an abbreviation for the State followed by a "Z" which indicates that it is a State identification.

It is illegal for anyone (manufacturer, dealer, distributor or consumer) to alter or remove a Hull Identification Number without the express written authorization of the Commandant, U.S. Coast Guard.

CERTIFICATION LABEL:

Unlike many kinds of commercial vessels, recreational boats are not individually inspected by the Coast Guard to determine compliance with Coast Guard safety standards. Instead, the boat manufacturer is held responsible for compliance and is required to affix a certification label to each boat stating that the boat complies with applicable Coast Guard Safety Standards in effect when manufactured. This regulation went

which may be required to be displayed on the bow of your boat. The HIN is a Federal requirement; your boat's registration number is a State requirement similar to the license plate on your car. The HIN however, is required to be shown on the State certificate of registration.



KEY TO MONTH OF MODEL YEAR

AUG	A	FEB	G
SEP	B	MAR	H
OCT	C	APR	I
NOV	D	MAY	J
DEC	E	JUN	K
JAN	F	JUL	L

Figure 1 - HIN Formats Before August 1, 1984

The boat manufacturer must display two identical hull identification numbers, no less than one-fourth of an inch high, on each boat hull. The primary HIN must be permanently affixed so that it can be seen from outside the boat - to the starboard side of the transom within two inches of the top of the transom, gunwale, or hull-deck joint, whichever is lowest. On boats without transoms or on boats on which it would be impractical to use the transom, the HIN must be affixed to the starboard outboard side of the hull, aft within one foot of the stern and within two inches of the top of hull side, gunwale, or hull/deck joint, whichever is lowest. The starboard outboard side of the hull aft is the preferred location for many boat manufacturers. On catamarans and pontoon boats the HIN must be affixed on the aft crossbeam within one foot of the starboard hull attachment.

into effect on November 1, 1972. Like the HIN, it is illegal for anyone to alter or remove the certification label once it is affixed. This certification statement may be printed on a separate label or combined into one label with the U.S. Coast Guard Maximum Capacities label. NOTE: If a boat is not subject to any of the standards, for example, a canoe or inflatable boat, then the manufacturer is not required to affix a certification label.

U.S. COAST GUARD MAXIMUM CAPACITY LABEL:

This safety standard applies to boats that are subject to the Safe Loading Standard and outboard powered boats which are subject to the Safe Powering Standard. The regulation requires the manufacturer to post the U.S. Coast Guard Maximum Capacities label where it is visible to the operator when getting the boat underway. The general format and appearance of the label is shown in Fig.3. (Note: Labels on boats built prior to August 1, 1980, will show persons capacity in terms of total pounds only.)

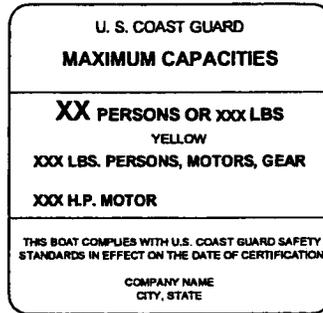


Figure 3 - Combined U.S. Coast Guard Maximum Capacities and Certification Label

The capacity information on the label is intended as a guide for the operator. A prudent boater should treat the ratings as if they are absolutes and not to be exceeded. Many State enforcement authorities consider operation of a boat in excess of the capacity ratings to be negligent operation and will cite the operator accordingly. Many insurance companies will refuse to insure a boat powered with an outboard engine that exceeds the horsepower rating on the capacity label. And finally, many boat manufacturers may refuse to honor warranty claims if the boat is matched with an outboard engine that exceeds the maximum power listed on the Coast Guard capacity label.

SAFE LOADING STANDARD:

This standard applies to the following types of monohull boats less than 20 feet in length manufactured on or after November 1, 1972: manually propelled boats (rowed or paddled), outboard boats, and boats with inboard engines or sterndrive units. The standard does not apply to canoes, kayaks, inflatable boats, and sailboats.

The standard requires the manufacturer to calculate the weight carrying capacities of the boat and to provide this information on a capacity label (Fig. 3). The standard was developed because of the simple fact that the interior of a small boat can often physically accommodate more people and gear than the boat can safely carry. At the time the standard was written, a leading cause of boating fatalities was swamping and capsizing due to overloading. Overloading a boat reduces the freeboard and makes the boat more likely to swamp in bad weather or from the wakes of other boats. Overloading can also often have disastrous effects on the stability and controllability of a boat, particularly if the weight is unevenly distributed or moves about suddenly (as with a number of people).

Using test methods prescribed in the standard, the manufacturer calculates two weight capacities: the maximum persons capacity and the maximum weight capacity (the total weight carrying capacity of the boat). The persons capacity is the most prominent information because it is what is referred to as a "live

load" that can move around the boat and affect stability. Generally, the persons capacity is less than the maximum weight capacity, except on very small boats where the persons capacity and maximum weight capacity may be the same.

The maximum persons capacity is shown on the label both in terms of the number of people and the total number of pounds. The total pounds should be regarded as the controlling figure. The number of persons is provided as a convenient, if approximate, guide for the operator. If you subtract the persons capacity from the maximum weight capacity on an outboard powered boat, you get a figure that represents the total weight of portable gear (such as an outboard engine, portable fuel tanks, ice chests or coolers, bait boxes, etc.) that can be brought aboard. A boater who wants to bring aboard more portable gear than allowed for, will have to carry fewer people to compensate.

SAFE POWERING STANDARD:

This standard applies to monohull outboard boats less than 20 feet in length manufactured on or after November 1, 1972. The standard does not apply to canoes, kayaks, inflatable boats, and sailboats.

The standard requires the boat manufacturer to calculate the maximum horsepower the boat can safely carry and to post this information on the U.S. Coast Guard Maximum Capacities label (Fig 3).

The standard tries to deal with two aspects that must be considered when matching an outboard engine to a boat: horsepower and weight. Too much power can make a boat difficult to control. Also, as the power of an engine increases, so generally does the weight. Thus, overpowering can lead to stability problems caused by too much weight hung on the stern, which in turn can decrease freeboard at the stern and increase the likelihood of following seas or wakes coming aboard over the transom.

LEVEL FLOTATION STANDARD:

This standard applies to monohull outboard boats and manually propelled boats (rowed or paddled) less than 20 feet in length, manufactured on or after August 1, 1978. The standard does not apply to sailboats, canoes, kayaks, inflatable boats, submarines, surface effect boats, amphibious boats or vehicles, or race boats.

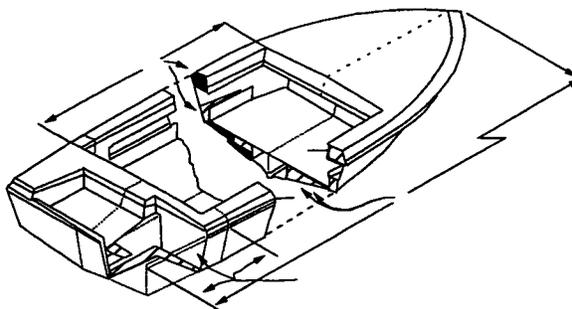


Figure 4- Location of Flotation Material In Typical Outboard Runabout Equipped with Level Flotation

Coast Guard accident statistics suggest that many drownings could be prevented after a capsizing or swamping accident, if the occupants would stay with the boat rather than attempting to swim to shore. The Level Flotation Standard requires the manufacturer to provide enough flotation material in a boat so that, if the boat is holed or swamped, the fully loaded boat will float with the passenger carrying area at or just below the surface of the water. The net effect is that the boat provides a survival platform that the occupants can stay with until help arrives. Even if the boat capsizes, the overturned hull must still float basically at the surface so the occupants can get out of the water by climbing onto the hull. (The flotation

standard poses another good reason for not exceeding the weight capacity: an overloaded boat may have its emergency flotation performance substantially reduced.)

Most manufacturers use some type of foam flotation material. The standard requires that the flotation material must be able to withstand the environment in which it is placed. Flotation foams that are not resistant to oil and gasoline cannot be placed near the engine or in the bilges. Foams that deteriorates under ultraviolet light cannot be left exposed to sunlight, and foams that are brittle and chip easily cannot be left exposed where they could be damaged by occupants or normal wear and tear on the boat.

Air chambers may be used as an alternative to foam. If the air chambers are rubber or vinyl air bags, they must be secured or confined and placed so that they cannot be punctured. If the manufacturer uses rigid air chambers, part of the hull cannot be used to form a wall of the air chamber since a crack in the hull could eliminate any buoyancy in the air chamber.

BASIC FLOTATTON STANDARD:

This standard applies to monohull inboard boats, inboard-outdrive boats, and air boats less than 20 feet in length, manufactured on or after August 1, 1978. The standard does not apply to sailboards, canoes, kayaks, inflatable boats, submarines, surface effect boats, amphibious boats or vehicles, and race boats. (Note: Before the advent of the Level Flotation Standard, the Basic Flotation Standard applied to monohull boats less than 20 feet in length except sailboats, canoes, kayaks and inflatables manufactured between August 1, 1973 and July 31, 1978.)

The Basic Flotation Standard is similar to the level Flotation Standard except that the degree of flotation performance required in basic flotation is not as great. In basic flotation, the boat manufacturer must provide enough flotation to keep any portion of the boat above the surface of the water after a flooding or capsizing accident so that passengers can hang on until help arrives.

Level flotation performance has not been required for inboard boats because: (i) accident statistics indicate that swamping and capsizing accidents are not as prevalent with inboard boats; and (ii) it would require relatively large and costly amounts of flotation material to compensate for the heavier inboard engines.

FUEL SYSTEM STANDARD:

The Fuel System Standard applies to any boat that has a permanently installed gasoline engine for electrical generation (generators), mechanical power or for propulsion (inboards and sterndrives). The standard does not apply to outboard boats or boats equipped solely with diesel engines. The standard went into effect on August 1, 1977.

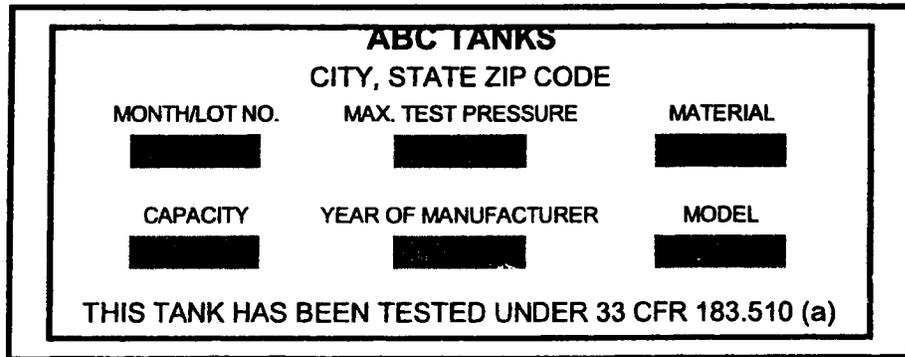


Figure 5 - Typical Fuel Tank Label

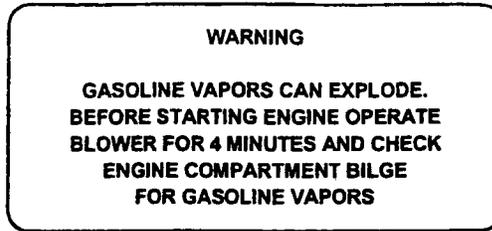


Figure 6 - Blower label

Owner Maintenance: The Ventilation System Standard is somewhat unique in that it has a companion regulation that requires the boat operator to keep the natural and powered ventilation systems in working order. Basically, this means keeping the system of blowers, ducts, and openings described in the preceding paragraphs in good condition. If the blower has to be replaced, the owner should replace it with a blower of the same rated capacity as the original equipment. Blower capacity is rated in terms of cubic feet per minute (cfm). If at all possible, it would be best to obtain an "OEM" blower (original equipment manufacturer) through the boat dealer.

START-IN-GEAR PROTECTION STANDARD:

This standard applies to outboard motors that develop a static thrust of 115 pounds or more (usually, outboards rated at 5 h.p. or more) and outboard motor controls designed for use with such motors. The regulation went into effect on August 1, 1982,

The standard is designed to prevent operators from unintentionally starting an outboard motor while it is in gear. At the time the standard was developed, this was a major cause of falls overboard from small boats. The usual accident scenarios began with the operator moving to the stern of the boat and starting the engine while in the standing position. If the engine started in gear, the operator was often suddenly thrown out of the boat into the water.

In most instances, the start in-gear protection feature is built into the outboard engine and there is no way the operator can tell by simple visual inspection whether or not the engine has the feature. The standard requires no certification label attesting to compliance. The ability to start-in-gear any outboard engine much larger than 5 h.p. (or which can otherwise be determined to have 115 lbs or more of static thrust) is an indication the engine is not in compliance with the standard. Outboard engines which are designed for use with remote, starting controls (used, for example, on "center console" boat designs), need not have the start-in-gear protection feature but the starting controls must. Under the standard, it is the responsibility of the boat manufacturer, distributor, or dealer (whichever one rigs the controls and engines on the boat) to make this match prior to the sale of the boat to the consumer.

Some outboard engines may display the following label: "Warning - ensure shift control is in neutral before starting motor." This warning is seen on engine installations where start-in-gear protection is in the remote starting control but where the manufacturer provides a back-up or emergency starting control on the engine itself. The label is intended to warn the operator whenever he or she uses the back-up starting control that it does not have start-in-gear protection.

MAINTENANCE AND REPLACEMENT PARTS:

Boaters must always keep Coast Guard Boating Safety Standards in mind when carrying out continuing upkeep of a boat or engine.