



Boating Safety Circular 85

RECREATIONAL BOAT MANUFACTURERS SUBPART M - NAVIGATION LIGHTS

More than three years after the effective date of updated Coast Guard regulations requiring manufacturers of recreational boats who install navigation lights to install lights with third party certification, confusion continues. Although navigation lights were the topic of recent writings in the American Boat and Yacht Council (ABYC) Newsletter, and the subject of briefings at industry gatherings, Coast Guard and NMMA factory visits continue to identify numerous issues of navigation light fixtures and installations that do not comply with Federal regulations.

As of November 1, 2003, 33 CFR 183.810 requires recreational vessel manufacturers, distributors, and dealers installing navigation lights in new recreational vessels to meet the requirements for certification and markings. Coast Guard regulations require navigation lights to be certified to the applicable requirements of ABYC A-16 (or equivalent standard) by an independent laboratory listed by the Coast Guard. Lights meeting this requirement must carry labels indicating compliance. Specifically, the light must have a permanent and indelible label, that is visible without removing or disassembling the light containing the following information:

- a. "USCG Approval 33 CFR 183.810;"
- b. "Meets (insert standard – ABYC A-16, or equivalent)...;"
- c. "Tested by (insert CG listed lab performing test)...;"
- d. Name of manufacturer;
- e. Model number;
- f. Visibility of light in nautical miles;
- g. Date on which light was type-tested; and
- h. Identification and specification of bulb used in compliance test.

Many light fixtures used on recreational boats are not large enough to permit legible display of all of

the above information. In that case, the required information may be placed in, or on the package containing the individual light, AND each light must be marked with "USCG" followed by the range of visibility; e.g. "USCG 2nm". This marking must be visible without removing the light, and must be permanent and indelible.

The Coast Guard Recreational Boating Product Assurance Division has received a variety of questions regarding the ABYC requirement that fixtures be marked with "A-16." According to ABYC A-16.8.9.3:

"the mark 'A-16'...shall indicate design conformance with this standard."

This is followed by an exception to A-16.8.9.3:

"Navigation lights that comply with the marking requirements of 33 CFR 183.810."

In other words, Coast Guard regulations require a compliant fixture to be marked with a minimum of "USCG Xnm" and ABYC A-16.8.9.3 allows a fixture to be marked with the same minimum information (provided the other information is placed in or on the package containing the individual light fixture).

Another issue that causes many noncompliance citations is the "Manufacturer Certification of Compliance" label. Section 181.9 of 33 CFR 181, Subpart B, requires that:

"Each manufacturer of a boat ... to which Part 183 of this regulation applies shall affix a certification label ..."

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Since boat manufacturers who install navigation lights are now subject to Subpart M of 33 CFR 183, some boat manufacturers who previously were not required to affix a certification label to their boats now must do so as required by 33 CFR 181.9.

Aftermarket light fixture installations (those done by owners) are not affected by the above requirements. Some light fixture manufacturers have elected to market their navigation lights only for the aftermarket. Others manufacture some models that comply with the regulations for new boat installations, and others that do not. Some navigation light fixtures available in the marketplace are not suitable for installation on new boats by OEM boat manufacturers. Therefore boat manufacturers need to be sure to verify when sourcing lights for new installations that they comply with the navigation light regulations.

Another area that often causes problems is the installation of navigation light fixtures on boats. Both the Navigation Rules and ABYC A-16 state that navigation lights must be installed such that the light is visible within certain *horizontal and vertical sectors*. In many instances, especially when small light fixtures are mounted below the vessel's sheer, lights are not visible over the required horizontal and vertical sectors of visibility.

See Annex 1 of COLREGS, and Inland Rules for further technical information on sectors of visibility. Navigation rules 20 through 23 and rule 25 provide basic recreational boat navigation light requirements.

Practically speaking, the major installation issue causing non-compliant installations is failure to position lights in accordance with the fixture manufacturer's requirements with regard to the boats' centerline, and the vertical orientation of the fixture. In addition, in many other non-compliant installations, there is insufficient vertical separation between the sidelights, and the masthead or all-round light. A minimum of one meter is required.

Contact the Coast Guard Recreational Boating Product Assurance Division (202) 372-1077, or ABYC Technical Department (410) 990-4460 with questions regarding navigation light installations.

MANUFACTURER IDENTIFICATION CODES

ABC00001C607

The serial number above is a hull identification number (HIN). The first three characters in the HIN above are a Manufacturer Identification Code (MIC).

The Coast Guard Recreational Boating Product Assurance Division will assign a MIC only to U.S. manufacturers and U.S. importers who are in the business of building or importing recreational boats for the purposes of sale to the public. Manufacturer Identification Codes and information about the companies to which they were assigned are entered into a computerized database at Coast Guard Headquarters.

See: http://www.uscgboating.org/recalls/mic_database.html

One part of the Recreational Boating Standards program consists of visits to recreational boat manufacturers and importers by *Compliance Associates* who are under contract with the Coast Guard. The purposes of the visits are: (1) to find boat builders who may be unaware about Coast Guard boating safety standards and regulations; (2) to educate manufacturers and importers about the various features of the Coast Guard Recreational Boating Product Assurance Division program; and (3) to ensure that boats under construction on the factory floor comply with applicable Coast Guard safety standards and regulations. The Compliance Associates plan their visits based upon manufacturer/importer name and address information in the Coast Guard Manufacturer Identification Code database.

According to Section 181.33(b) of the Hull Identification Number regulations:

“a manufacturer or importer who changes the business name or address must advise the Recreational Boating Product Assurance Division, 2100 Second Street SW, Washington, DC 20593-0001 of the change in writing.”

This means if you are a boat manufacturer or importer with a Manufacturer Identification Code, you have a legal obligation to inform the Coast Guard if you change your business name or move your factory or place of business to another location. As a result, time and money aren't spent unnecessarily trying to determine whether you are still building boats for the purposes of sale to the public.

Incidentally, the Coast Guard has been assigning Manufacturer Identification Codes to boat manufacturers and importers since 1972. Typically there are about 3,500 active manufacturers and importers annually. This means there are limited numbers of three letter codes which can be assigned annually. Codes issued to companies which are out of business 10 or more years may be reassigned to new builders. If you are assigned a Manufacturer

Identification Code and suspend your boatbuilding operations, but intend to resume building boats in the future, you need to keep us informed concerning your business status, so your Manufacturer Identification Code isn't assigned to another company.

BOATS VS. BARE HULLS

When a boat leaves the place of manufacture or assembly for the purposes of sale, it must comply with applicable Coast Guard safety standards and regulations:

- All boats must bear two identical Hull Identification Numbers (HINs): (1) a primary HIN (usually affixed to the transom); and (2) a duplicate HIN (affixed to an unexposed location on the interior surface of the boat or beneath a fitting or item of hardware).

- If the boat is a monohull that is less than 20 feet in length, and is not a sailboat, canoe, kayak or inflatable, it must bear a U.S. Coast Guard Maximum Capacities label and contain flotation.

- If a boat is inboard powered and uses gasoline as fuel, it must comply with the Electrical, Fuel and Ventilation Standards.

- If a boat will be outboard powered with remote steering, shift controls must be designed for start-in-gear protection.

- If a boat is equipped with navigation lights, the lights must be certified.

- Finally, if the boat is subject to a Coast Guard safety standard, it must bear a certification label.

A bare hull is not a boat:

- A bare hull manufacturer has no way of knowing the eventual weight of the finished boat (necessary for determining safe loading information and any required volume of flotation material).

- A bare hull manufacturer has no way of knowing whether the finished boat will be powered by an outboard or an inboard and whether the fuel used will be gasoline or diesel.

- The bare hull manufacturer does not install navigation lights.

- If the finished boat is later recalled for failure to comply with an applicable Coast Guard safety standard or for a defect which creates a substantial risk of personal injury to the public, the bare hull manufacturer should not be legally responsible for defect notification and correction (unless, of course, such a defect involved complete hull failure).

Bare hull manufacturers are not boat manufacturers. There are no Coast Guard safety standards or

regulations which apply to a bare hull. **Therefore, a bare hull manufacturer should not:**

- (1) affix a HIN, because the Manufacturer Identification Code in an HIN affixed to a boat identifies the entity that is legally responsible for construction of the entire boat -- not just the hull;

- (2) affix a certification label;

- (3) affix a U.S. Coast Guard Maximum Capacities label; or

- (4) install flotation.

The Flotation Standard is predicated on the assumption that a manufacturer has performed certain tests in accordance with the Safe Loading Standard. Since these tests are not performed on bare hulls, then logically, there is no regulation requiring a bare hull manufacturer to install flotation material.

Instead, the individual or company that buys a bare hull is subject to the regulations. The individual who buys a bare hull to complete for his or her own use would obtain a Hull Identification Number from the State where he or she resides.

A company engaged in the business of assembling a bare hull and an engine package would be the one that should apply for a MIC, assign the Hull Identification Number and, if necessary, build the boat to comply with applicable Coast Guard safety standards and regulations.

The Recreational Boating Product Assurance Division recognizes that there are boat manufacturers with Manufacturer Identification Codes who manufacture both finished boats and bare hulls. The finished boats must be built to comply with the regulations; however, the bare hulls they sell for completion by individuals or other companies should be free of HINs or other compliance labels.

KIT BOAT MANUFACTURERS AND COAST GUARD SAFETY STANDARDS AND REGULATIONS

At the end of Session 403 - Wooden Kit Boats - during the International Boat Builders' Exhibition and Conference (IBEX) in Miami Beach, Florida on November 2, 2006, many attendees were surprised to learn that kit boat manufacturers are subject to U.S. Coast Guard safety standards and regulations.

The term, "recreational vessel manufacturer" in section 2101 of Title 46, United States Code means:

"a person engaged in the manufacturing, construction, assembly or importation of recreational vessels, components [emphasis supplied], or associated equipment."

Further, §181.7 of Title 33, Code of Federal Regulations states, in part:

“Unless there is affixed to it a certification label that contains the information required by §181.15:

(a) No person who manufactures, constructs, or assembles a boat ... may deliver that boat ... for the purposes of sale.”

Coast Guard safety standards and regulations in 33 CFR Parts 181 and 183 apply to manufacturers of recreational boats for the purposes of sale to the public. Just because a kit boat builder manufactures a set of components for eventual assembly by an individual for his or her personal use does not relieve the kit boat builder from the legal obligation to provide the purchaser with all components and instructions necessary to build the boat in compliance with the regulations.

All recreational boats manufactured for the purposes of sale to the public must have a primary and a duplicate hull identification number (HIN) affixed. Therefore, all kit boat manufacturers must obtain a Manufacturer Identification Code (MIC) and assign Hull Identification Numbers. If, due to the nature of the kit, a HIN cannot be affixed to a kit part, the kit boat manufacturer needs to provide purchasers with instructions which will result in the proper placement and attachment of the Hull Identification Numbers.

If the completed boat is a monohull boat less than 20 feet in length, that is not a sailboat, canoe, kayak, or inflatable, the kit boat manufacturer is subject to applicable Coast Guard safety standards in 33 CFR Part 183 (Display of Capacity Information, Safe Loading, Safe Powering and Flotation). If a U.S. Coast Guard Maximum Capacities label displaying maximum horsepower, maximum persons and maximum weight capacities cannot be pre-placed on a part, the kit manufacturer should provide instructions to explain the proper placement of the capacity label.

GRATINGS AND DECORATIVE COVERS ON VENTILATION SYSTEM OPENINGS

The design and installation of natural and powered ventilation systems on boats is a critical safety issue in the prevention of boat fires and explosions. Some builders are installing gratings and decorative covers on natural and powered ventilation system openings which reduce the effectiveness of their boats' ventilation systems.

Unless the compartment is open to the atmosphere, a **powered ventilation system** (exhaust blower) is

required in each compartment in a boat that has a permanently installed gasoline engine with a cranking motor. The powered ventilation system must provide an air flow capacity (both for rated blower capacity and for system output) determined as a function of the net compartment volume.

Unless the compartment is open to the atmosphere, a **natural ventilation system** consisting of supply and exhaust openings is required in each compartment in a boat that:

- (1) contains a permanently installed gasoline engine;
- (2) has openings between it and a compartment that requires ventilation;
- (3) contains a permanently installed fuel tank and an electrical component that is not ignition-protected in accordance with §183.410(a);
- (4) contains a fuel tank that vents into that compartment; or
- (5) contains a nonmetallic fuel tank with a permeability rate in excess of standards.

The cross-sectional area of the supply and exhaust openings in the natural ventilation system is based upon the net compartment volume.

The exhaust duct connected to an engine compartment blower is considered to be a part of the natural ventilation system, because the blower does not restrict the flow of air. The installation of gratings and decorative covers over ventilation system openings, however, does restrict air flow. Such gratings and decorative covers reduce the aggregate cross-sectional area for ventilation system openings and reduce the effectiveness of natural and powered ventilation systems.

For example, an engine compartment with a net compartment volume of 80 cubic feet would require a powered ventilation system with a blower capacity of 120 cubic feet per minute (and system output of 48 cubic feet per minute) and a natural ventilation system with supply and exhaust openings of 13.85 sq in each. A natural ventilation system consisting of two 3-inch diameter openings for both supply and exhaust would be acceptable ($7.1 \text{ sq in} \times 2 = 14.2 \text{ sq in}$ total). If, however, opening gratings/covers drop the open area to 10 sq in, the natural ventilation system would not be in compliance with the regulations. The output of the powered blower system would likewise be unacceptable if the tested output, due to the placement of the gratings/covers, dropped below 48 cfm.

Over-sizing of the ventilation system hull/deck openings to allow for the net decrease due to any gratings/covers – to still meet the aggregate natural

ventilation system opening size requirement (and powered system output) would result in an acceptable ventilation system design, with proper consideration for all design factors.

AFTER 31 DECEMBER 2006 BOATERS MUST NOT OPERATE 121.5/243 MHZ EPIRBs

WASHINGTON, DC - The Coast Guard reminds all boaters that beginning January 1, 2007, both 121.5 and 243 MHz Emergency Position Indicating Radio Beacons (EPIRBs) are prohibited from use in both commercial and recreational watercraft. Boaters wishing to have an emergency rescue beacon aboard their vessel must have a digital 406 MHz model.

The January 1, 2007, date to stop using 121.5 MHz EPIRBs is in preparation for February 1, 2009, when satellite processing of distress signals from all 121.5/243 MHz beacons will terminate. Following this termination date, only the 406 MHz beacons will be detected by the International Cospas-Sarsat Satellite System which provides distress alert and location data for search and rescue operations around the world.

The regulation applies to all Class A, B, and S 121.5/243 MHz EPIRBs. It does not affect 121.5/243 MHz man overboard devices which are designed to work directly with a base alerting unit only and not with the satellite system.

This change, in large part, was brought about by the unreliability of the 121.5/243 MHz beacons in an emergency situation. Data reveals that with a 121.5 MHz beacon, only one alert out of every 50 is a genuine distress situation. This has a significant effect on expending the limited resources of search and rescue personnel and platforms. With 406 MHz beacons, false alerts have been reduced significantly, and, when properly registered, can usually be resolved with a telephone call to the beacon owner. Consequently, real alerts can receive the attention they deserve.

When a 406 MHz beacon signal is received, search and rescue personnel can retrieve information from a registration database. This includes the beacon owner's contact information, emergency contact information, and vessel/aircraft identifying characteristics. Having this information allows the Coast Guard, or other rescue personnel, to respond appropriately.

In the U.S., users are required by law to directly register their beacon in the U.S. 406 MHz Beacon Registration Database at:

<http://www.beaconregistration.noaa.gov/>

or by calling 1-888-212-SAVE. Other users can register their beacon in their country's national beacon registration database or, if no national database is available, in the International Beacon Registration Database at:

<https://www.406registration.com/>

The United States Coast Guard is the lead agency for coordinating national maritime search and rescue policy and is responsible for providing search and rescue services on, under and over assigned international waters and waters subject to United States jurisdiction.

COMMERCIAL VS. RECREATIONAL

Sales of "commercial boats" to members of the public who will use them as recreational boats are prohibited by law. According to subparagraph 4307(a)(1)(A)(1) of Title 46 of the United States Code -- Prohibited Acts: "A person may not -- manufacture, construct, assemble, sell or offer for sale, introduce or deliver for introduction into interstate commerce, or import into the United States, a recreational vessel, unless -- it conforms with this chapter or a regulation prescribed under this chapter." The regulations and safety standards applicable to manufacturers of recreational boats in 33 CFR Parts 179, 181 and 183 were written under the authority of 46 U.S.C. Chapter 43.

A significant number of small boat manufacturers are designating their boats "For Commercial Use," and several State boating officials have observed these boats being used for general recreational purposes. These boats usually are not equipped or built to meet Federal safety standards and regulations, even though their manufacturers have produced recreational boats from the same molds. They may cost less than the same boat certified to meet Federal standards. Therefore, there is an incentive to sell the less expensive boat, the "For Commercial Use" boat, for recreational purposes. While the Coast Guard is concerned about the commercial fisherman who may occasionally use the boat for a family outing, of equal concern is the individual who buys a commercial boat for recreational purposes. Some purchasers mistakenly believe that a boat built "For Commercial Use" is more rugged and is therefore safer than the typical recreational boat.

The Coast Guard distinguishes between commercial boats and recreational boats by the manner in which they are advertised and labeled. If they are not equipped with the proper certification labels and there is further evidence, such as the absence of labels saying “For Commercial Use,” indicating that the manufacturer did not intend to build them to meet the standards, the Coast Guard has the authority to initiate Civil Administrative Penalty procedures against the seller and the builder of the boat. The basis is a violation of 46 U.S.C. 4311(b)(1):

“A person violating section 4307(a) of this title is liable to the United States Government for a civil penalty of not more than \$5,000, except that the maximum civil penalty may not be more than \$250,000 for a related series of violations.”

Finally, a manufacturer or dealer who knowingly sells a boat that does not comply with applicable safety standards and regulations for use as a recreational boat may suffer other serious financial penalties if the purchaser has an accident. Both the courts and juries are showing an increasing inclination to assess substantial penalties in product liability suits.

While the Coast Guard recognizes that operators such as commercial fishermen may legally use “commercial boats,” the Coast Guard recommends that as a minimum they use boats that meet the Federal safety standards and regulations in 33 CFR Parts 181 and 183.

PAIN IN THE GAS

The following article was originally published in the August/September 2006 issue of *Professional BoatBuilder* magazine and is reprinted here with the permission of the authors and the editors of *Professional BoatBuilder*.

So a mechanic, a designer, and an insurance agent walk into a bar....No, seriously: A mechanic, a designer, and an insurance agent did in fact write in to *Professional BoatBuilder*, each concerned about the effects of recently reformulated gasoline on marine engines and fuel systems. Their views are presented here.

An Introduction to the Problem

by Aaron Porter

Tough to keep pace with today’s volatile petroleum market in the United States—and all the attendant regulations. Ordinarily, it’s safe to leave the sweating over details of energy and environmental policy to commodities traders, petroleum distributors, and the U.S. Environmental Protection Agency. But not this year. The widespread adoption of ethanol—an alcohol derived from fermented carbohydrates—as a gasoline additive may be good news for Midwestern farmers and fuel-filter manufacturers, but it’s an expensive nuisance and even a danger to boat owners, builders, and repairers.

Ethanol’s properties as a fuel additive are well-suited to North America’s automotive fuel needs: it can be produced domestically; it performs as an effective oxygenate, reducing harmful emissions such as benzene; and, it doesn’t contaminate groundwater the way methyl tertiary butyl ether (the ether-based oxygenate it is supplanting) can.

For the marine industry, though, the fit isn’t so good. Ethanol is a solvent that doesn’t mix well with the MTBE fuel lingering in some tanks; it scours fuel systems, overburdening filters; it breaks down fiberglass fuel tanks; and it rapidly absorbs water from atmospheric humidity, giving the fuel only a brief useful shelf life. Ethanol’s adoption is changing the way gasoline-powered boats are maintained, serviced, used, and with regard to some components, constructed.

So why are petroleum refiners switching from MTBE to ethanol? Contrary to many reports, there is no federal ban on MTBE—although numerous states have enacted their own legislated prohibitions on the additive. Nor is the switch driven by the EPA requirement that gasoline be sold with 2.08% oxygenate content. (That rule, cited by the petroleum industry as a factor steering it to ethanol, was withdrawn by the EPA on May 5, 2006 in order to square with the provisions on reformulated fuels in the 2005 Federal Energy Policy Act.) The remaining federal regulation, which promotes the use of oxygenates without explicitly requiring them, is a limit on the harmful emissions that may come from gasoline when it’s combusted. That means, while refiners are no longer required to blend an oxygenate with gasoline, incorporating one remains the most expedient way to meet emissions standards. Since

ALCOHOL CONTENT	
Max. % by Volume	
Ethanol	10%
Methanol	0%
Alcohol Cosolvent	0%

MTBE—ethanol’s only presently viable alternative—has been banned in so many states, and since the threat of litigation for environmental damage from it looms, refiners are really left with ethanol as their lone workable oxygenate. Like it or not, ethanol-blended gasoline is what’s coming down the pipeline.

Professional BoatBuilder has received a stream of warnings and concerns from the marine industry about the likely effects of this fuel reformulation. While some specific impacts of the change remain the subject of debate, there are precautions that can be taken now to protect boats as well as their owners, builders, and repairers from the potential hazards of the switch to ethanol. In this initial cautionary look at the problem, we include the most immediately relevant experiences and perspectives of a marine mechanic, a yacht designer, and a marine insurance provider. If their accounts of the pending risks and complications are any indicator, there’ll be plenty more to read on this subject in coming issues of the magazine.

About the Author: Aaron Porter, who assembled this article, is associate editor of *Professional BoatBuilder*.

I. A Mechanic’s Warnings

by Dan Crete

Due to federal laws requiring the use of oxygenates in densely populated, polluted “non-attainment areas,” and state laws that forbid MTBE, the New York and Connecticut boating region got an early taste of the switch to 10% ethanol blend—also known as E10 gasoline—during the 2005 boating season. The area had previously been receiving MTBE gasoline. There was little warning about this changeover. As the 2005 season unfolded, reports of fuel-system problems began to surface. Complaints ranging from clogged fuel filters to engine failures became more common as the 2005 season progressed. Fortunately, we can draw on the experiences of boaters and boatyards in

New York and Connecticut as we plan for the more widespread switch to ethanol.

One of the first things learned about this new gasoline is that it does not mix well with MTBE gasoline. When these two fuels are combined there are several complications: most prevalent is a tendency for the E10 to severely clog and even deteriorate in-line fuel filters. There were also reports of volatility problems, with varying mixtures of the two products in boat fuel tanks throwing off the vapor pressure of the fuel. That led to cold-start and even vapor-lock problems. In addition, isolated cases of severe corrosion of aluminum fuel-system parts have been documented and attributed to mixing of the two reformulated fuels.

To avoid blending the two fuels during the transition from MTBE to E10 it is recommended that fuel levels in tanks be run down to the lowest level safely possible before taking on any of the ethanol fuel. Remember, any fuel taken on last season outside of states with MTBE bans could be MTBE based. So far, this approach has allowed a seamless transition for people trying to avoid the problems resulting from the mixing of the two fuels.

Fuel suppliers are in transition, too. Boat owners who successfully navigate the initial switch need to be wary of where they take on fuel during the season as well. The key is to be sure to know which fuel each marina is dispensing. The determining factor will be just how much of last season’s fuel a given retailer has left. The MTBE mix must be completely sold off before any E10 can be put into the storage tanks. Some fuel sellers who have just a few hundred gallons on site will make the transition almost immediately. But I’m aware of several yards and marinas that have thousands of gallons of MTBE fuel in their tanks. For them, the transition could take several weeks or even months as the season gets going.

Retail customers must avoid making the initial transition to E10 with their normal retailer, then going elsewhere and unknowingly taking on MTBE on top of the E10 already in their tank. This was a big problem last season for boaters taking on fuel in Connecticut, and then making a trip to Rhode Island and unwittingly filling up with MTBE again.

Boat owners who trailer their boats and fill up at roadside stations (which have been dispensing E10 since mid March 2006) must also be made aware of this situation, as they’re likely to have MTBE in their boat tanks from last season.

Faith in Filters

Boatyards and marinas that retail fuel should take their own precautions with suppliers, and their own storage and dispensing equipment. Reputable fuel distributors in our region have given their customers ample warning about the steps to take with fuel storage tanks and dispensing equipment. Those include: cleaning gasoline storage tanks, being certain there is no water in the system; and upgrading fuel filters to 10-micron, ethanol-compatible, water-separating filters. Because ethanol is a solvent it is going to clean any dirt or contaminants both from dispensing and boat fuel systems. Ideally, these contaminants will be washed into solution in the gasoline and scrubbed out by the system's fuel filters. Yes, we are going to be changing a lot of fuel filters this summer. The reports from yards and boat owners are that filters clog often with the first loads of E10, but after burning through two or three tanks of fuel, the filters do take care of the dirt.

Carrying spare filters is going to be a must for boaters and retailers. Most filter manufactures are ramping up production of ethanol-compatible filters. If they're not already doing so, boatyards will need to stock a lot more filters than they have in the past. Boaters will need to have spares on board and the means to change them, including a way to safely store the old filter and the gasoline it contained while onboard. I would suggest an onboard kit with the proper tool and some sort of sealable container for storing old filters and gas. The industry standard seems to be 10-micron, water-separating filters. By all accounts they're doing a good job. Note: the 10-micron filters may pose a problem for some engine warranties. Consult the engine operator's manual, and talk to the dealer about what is best for that boat's application.

Water Hazards

Ethanol, being alcohol based, absorbs water very well. This is a bit of a double-edged sword for the marine industry. Marine fuel systems are very susceptible to water intrusion. E10 has the ability to absorb a certain amount of water into solution and simply allow it to be burned by the engine. As an improvement over MTBE gasoline, which can hold about 600 ppm in solution, E10 can hold 6,000 to 7,000 ppm in solution. Meaning, if you have a 100-gallon (378.5 l) tank it could hold up to .6 – .7 gallons

(2.3–2.6 l) of water in solution. The problem for the ethanol alternative comes with “phase separation.” That's what happens when the fuel is saturated beyond its capacity to hold water in solution. The water and gasoline actually separate, and the gasoline floats on top of the water. With MTBE you could simply pump the water out from under the gasoline, or let your filters remove the water, and burn any gasoline that remained. With E10, ethanol blends more easily with water than it does with gasoline. When phase separation occurs in E10, the ethanol is pulled out of the gas and stays with the water. This result is two solutions, neither of which is good for engine or fuel system. The gasoline left behind now has no oxygenate; it shouldn't be burned in the engine and must be disposed of. The water left behind now contains a high concentration of ethanol; this solution is highly corrosive and damaging to any materials it may be in contact with in the fuel system. The only solution to dealing with E10 that has phase separated is to dispose of the whole load of fuel, clean the tank, and start fresh with a new load of E10.

Every precaution must be taken to keep water out of fuel in storage tanks and on board. Checking fill caps and fittings for proper gaskets, and insuring that vent systems are up to spec, are two ways of being certain your fuel system is sound. In addition, retailers should stick their tanks with alcohol-compatible, water-finding paste daily and after each load of fuel is brought in by distributors. Check their tanks during delivery; if the fuel has water in it, refuse the load. Make it the distributor's problem if that company delivers bad fuel. As a retailer, you'll need to be able to ensure that your customers are getting a product of the highest quality. The damage that corrosion from phase separation can do to your own storage tanks is expensive if left unchecked.

E10's ability to absorb water has yet another drawback: it can absorb water directly from the atmosphere through the vent while simply sitting in the tank. In just 100 days at 70% humidity, E10 can absorb enough water to phase separate. The shelf life of E10 is only 60–90 days if left without treatment.

Gasoline “oxidizes” when exposed to air. That is, it loses its volatility over time. A good nonalcohol fuel stabilizer (we don't want to add even more alcohol to the mix) is highly recommended at all times in your fuel. There are several products on the market that will do a great job. But the key for any boatyard or boater is to not leave a boat for long periods of time with a large load of fuel aboard. If the yard or owner

knows there will be an extended delay between trips out, then leave the tank low and refill just before the next trip out. In general, the more the boat is used, the better off it will be.

When it comes to winter storage, a boatyard should run the tank down as low as possible at the end of the season and treat what is left for the winter. That of course goes against traditional thinking in terms of condensation, but: better a small amount of water from condensation than a tank full of bad gas.

***About the Author:** Dan Crete is a mechanic and foreman at Burr Brothers Boatyard in Marion, Massachusetts, and an instructor at Massachusetts Maritime Academy.*

II. A Designer's Perspective

by Dave Gerr

In *Professional BoatBuilder* No. 84 (August/September 2003), in the second of two articles I wrote on fuel systems, I explained the advantages of fiberglass fuel tanks for both gasoline and diesel. The recent introduction of ethanol gasoline dramatically alters those recommendations.

State and federal regulatory changes that led to the replacement of MTBE with ethanol have revealed a largely unforeseen problem with fiberglass gasoline fuel tanks. Since the switch to E10 began, there's been a sudden rash of tank and fuel problems. After research and testing arranged by Boat/US and several marine surveyors dealing with odd fuel-system failures, these problems have been traced back to the alcohol in ethanol gasoline reacting with and dissolving the resin in the walls of fiberglass fuel tanks. The process is chemically similar to fiberglass osmotic blistering—but much more aggressive and more pervasive. In fact, it's been found that all standard fiberglass resins are attacked by ethanol. Tank walls have been seriously weakened, causing leaks, and styrene and related chemical by-products dissolved in or reacted with the ethanol have worked their way into the engine where they've created serious fouling problems.

The least-resistant resin has been found to be orthophthalic (orthopolyester), followed by isophthalic (isopolyester), which holds up somewhat better. Epoxy resins are better still. I know of no tests to date on vinylester. Regardless, every one of these resins suffered noticeable degradation in contact with ethanol.

Until the advent of ethanol, fiberglass fuel tanks for gasoline were one of the best options possible. There are many thousands of gasoline-powered boats in service with fiberglass fuel tanks. This includes vessels from top builders such as Bertram and Hatteras. Newly adopted ethanol changes that. All these tanks are now suspect, and you should not design or build gasoline tanks of fiberglass.

Resin vendors say there are resin formulations that can be used safely with ethanol. However, these are not widely known in the boating industry and currently are not readily available. Before you could design and build a fiberglass tank for gasoline also safe for ethanol, you would need to consult the resin vendor,

Precautions for the Switch to Ethanol

- * **Do not mix MTBE with E10 gasoline.**
- * **Avoid water intrusion into your fuel system.**
- * **Run a nonalcohol fuel stabilizer in your boat's fuel system at all times. Recommended for equipment that sits for a lengthy period.**
- * **The more use the boat gets, the less likely it is to have problems. Don't leave large loads of fuel aboard an idle boat.**
- * **Install a good, water-separating fuel filter.**
- * **Keep a stock of spare fuel filters handy, and the means for safely changing them.**
- * **Replace older weather-faded plastic portable tanks with new tanks.**
- * **Retailers should inform their customers about which fuel is being dispensed; customers need to ask which fuel they're purchasing during the transition to E10.**
- * **Rubber fuel lines older than the mid-to late-1980s should be inspected and may need replacing.**
- * **Some older carbureted engines may require special tuning. Consult the engine manufacturer for details.**

The formulation changes and the new risks they bring are not as bad as they sound at first. For retailers, if your fuel dispensing system has been well cared for, and is clean and free of water, then you shouldn't have any trouble. As for boaters—who are, let us never forget, our customers one and all—if they've had problems with water in their fuel systems in the past, then those problems will only worsen with the introduction of E10. Correct the water situation, and start fresh with E10 gasoline. —Dan Crete

select a suitable resin, make a sample test panel, expose it for a long period of time to ethanol (months at least), and then test the sample to ensure it suffered no degradation of any kind.

The process of developing fiberglass tanks safe for ethanol will probably be worked out over the next several years. Until then, avoid fiberglass gasoline tanks in new construction. You must also be aware of this potential problem in existing vessels. When surveying, retrofitting, repairing, or simply owning or operating an older gasoline-powered boat, be sure to determine its fuel tank material. If fiberglass, then the tank needs special attention to ensure there's been no degradation due to ethanol.

The Diesel Exception

Note that diesel tanks are unaffected by this new development. There's no alcohol equivalent of any type for diesel. Biodiesel—the vegetable-based renewable energy source that can be blended with, or even wholly replace, petroleum diesel—is an oil, not an alcohol. Biodiesel does not degrade fiberglass resins. Fiberglass diesel fuel tanks are still an excellent choice, with all the advantages of fiberglass tanks described in the original PBB article.

***About the Author:** Dave Gerr is the director of Westlawn Institute of Marine Technology and maintains his longstanding design practice, Gerr Marine, based in New York City. He is the author of Propeller Handbook, The Elements of Boat Strength, and The Nature of Boats.*

III. Insuring the Ethanol Transition

by Jim Cassidy

Much has already been written about the problems that are arising (and will continue to escalate) due to the addition of ethanol to gasoline. Almost all such problems and potential problems occur in boats that have fiberglass or plastic-based fuel tanks and fuel system components that are not “ethanol-proof.” The results range from minor to potentially catastrophic. Any of them can generate insurance claims, which will run the gamut from needing a tow, or stalling and foundering, to fire or explosion and property loss—or worse, personal injury or death. Given the facts as they are now known, the potential for

disproportionately high loss-and-claim levels caused by ethanol-related problems is predictable.

Insurance is not intended to cover the predictable or the inevitable; rather, it exists to cover the unexpected. Therefore, the marine insurance industry must address the inevitable nature of ethanol-related losses. If marine insurers were to simply exclude coverage for any loss resulting from leaking or failed onboard fuel tanks or fuel-system components, then far too many boat owners who do not possess ethanol-vulnerable fuel tanks and systems would also be lacking coverage they should be able to have. Any fair and viable solution must be specific to those boats with ethanol-vulnerable systems.

Because my insurance company specializes in classic boats, which in most cases are older boats, we know we'll have a higher percentage than most insurance providers of clients whose fuel-system components are vulnerable to ethanol. This is a problem we've had to find a solution for. To provide the most comprehensive coverage without providing coverage for inevitable losses, we will add to all policies an endorsement that excludes coverage for ethanol-caused losses if the boat has vulnerable fuel tanks or system components. The precise wording of the endorsement is now being composed and should be in effect by the time you read this. By excluding claims resulting from only the failure of ethanol-vulnerable fuel system components we minimize the number of excluded claims conditions. For instance, should someone whose boat has a fiberglass fuel tank change to a new, nonethanol-vulnerable metal tank, then coverage for leaks from the new tank would automatically be provided starting from the time of replacement.

The entire matter of losses and claims resulting from ethanol-damaged fuel systems is not yet fully developed. Problems other than those already encountered may well come to light in the future. In the meantime, there's no doubt that, ultimately, all marine insurance companies will have to address the issue of ethanol and marine gasoline systems sooner rather than later.

***About the Author:** Jim Cassidy is an owner and principal of Heritage Marine Insurance, based in Mystic, Connecticut.*

RECALL CAMPAIGNS

ALUMACRAFT BOAT COMPANY

(St. Peter, MN)(060008T)

Year: 2001 – 2003

Models: Fisherman 145, Yukon, Lunker, Navigator and Magnum

Units: 2,129

Problem: Hinge pin on seats produced by Geldert's LLC may come loose causing seat back to separate from seat bottom

AMERICAN SUZUKI MOTOR CORPORATION

(Brea, CA)(050052T)

Year: 2004

Models: 4-Stroke V6 outboards:

DF200T w/ serial nos.

20001F-421546 – 421911

DF200Z w/ serial nos.

20001Z-421114 – 421149

DF225T w/ serial nos.

22501F-421292 – 421690

DF225Z w/ serial nos.

22501Z-421084 – 421192

DF250T w/ serial nos.

25001F-422026 – 422417

DF250Z w/ serial nos.

25001Z-421296 — 421384

Units: 1,012

Problem: Incorrect flywheel casting composition could cause flywheels to come apart; possibility of injury to boat occupants

AMERICAN SUZUKI MOTOR CORP.

(Brea, CA)(060036T)

Year: 2004 – 2006

Models: DF200, DF225 & DF250 outboard engines

Units: 8,335

Problem: Malfunctioning electronic control module can cause hard starting leading to fuel accumulation in the intake port; this condition along with a misfire during starting can result in severe engine backfire which damages the engine's collector assembly (air intake); if the collector assembly breaks, the engine cover could come off unexpectedly

BAYLINER MARINE CORP.

(Everett, WA)(060045T)

Year: 2005 – 2006

Models: Bayliner 185 Bowrider with 4.3L Engine Option

Units: 1,971

Problem: Possible steering binding condition; possibility of loss of steering control

BAYLINER MARINE CORP.

(Everett, WA)(060088T)

Year: 2007

Models: 195 Discovery

Units: 97

Problem: Improper helm installation results in steering backwards; danger of collision

BAYLINER MARINE CORP.

MAXUM MARINE DIV.

(Everett, WA)(060050T)

Year: 2005 – 2006

Models: Maxum 1800SR with 4.3L Engine Option

Units: 48

Problem: Possible steering binding condition; possibility of loss of steering control

BENNINGTON MARINE CORP.

(Elkhart, IN)(050077T)

Year: 2004 – 2005

Models: Pontoons w/ serial nos. ending in 404, 405

& 505 with Mercruiser 4.3L, 5.0L, 5.7L, 350 MAG and 6.2L I/O engines

Units: 230

Problem: Failure in Mercruiser power steering pump hose may cause loss of steering control; possibility of collision

BENNINGTON MARINE CORP.

(Elkhart, IN)(060039T)

Year: 2006

Models: "I Series" pontoon boats with black 31 gallon fuel tanks

Units: 900

Problem: Fuel tank leaks; possible fire/explosion if ignition source present

BOMBARDIER RECREATIONAL PRODUCTS

(Benton, IL)(060093T)

Year: 2003 - 2007

Models: All Sea-Doo Sportster (2003 - 2006)
All Sea-Doo Speedster 200 (2004 - 2006)
All Islandia (2006)
All Utopia (2006)
2007 Speedster 200
2007 Speedster 150
2007 Islandia
2007 Utopia

Units: 4,702

Problem: On Sportboats equipped with Rotax naturally aspirated 155 horsepower 4-TEC engine internal airbox parts can detach and be drawn into throttle body; throttle plate may jam and prevent return of throttle to idle position; danger of collision

**BOMBARDIER RECREATIONAL PRODUCTS
EVINRUDE OUTBOARDS DIV.**

(Waukegan, IL)(050039T)

Year: 2001, 2004 & 2005

Models: All 2001 200 – 250 HP DI models
2004 200 – 250 HP DI models w/ serial nos. 5050319 and later
2005 100 & 115 HP DI models w/ serial nos. All up to 5111879
2005 135 – 175 HP DI models w/ serial nos. All up to 5111879
2005 200 – 250 HP DI models w/ serial nos. All up to 5088447

Units: 5,922

Problem: Under certain operating conditions a fuel injector fastener could loosen and/or break; possible fire/explosion if ignition source present

**BOMBARDIER RECREATIONAL PRODUCTS
EVINRUDE MOTORS DIV.**

(Sturtevant, WI)(060042S)

Year: 2006

Models: 40 horsepower outboards

Units: 204

Problem: Software switch in Engine Management Module allows engine to be started in gear

**BOMBARDIER RECREATIONAL PRODUCTS
EVINRUDE MOTORS DIV.**

(Sturtevant, WI)(060052S)

Year: 2004 – 2007

Models: Evinrude E-TEC 40, 50, 60, 75 and 90 horsepower outboard engines

Units: 24,767

Problem: Fuel system pressurization during assembly may have damaged fuel filter; possible fire/explosion if ignition source present

BOMBARDIER RECREATIONAL PRODUCTS**JOHNSON MOTORS DIV.**

(Sturtevant, WI)(060034T)

Year: 2004 – 2006

Models: Johnson 200 & 255 outboard engines

Units: 746

Problem: Malfunctioning Electronic Control Module can cause hard starting leading to fuel accumulation in the intake port; this condition along with a misfire during starting can result in severe engine backfire which damages the engine's collector assembly (air intake); if the collector assembly breaks, the engine cover could come off unexpectedly

**BOMBARDIER RECREATIONAL PRODUCTS
JOHNSON OUTBOARDS DIV.**

(Sturtevant, WI)(050042T)

Year: 2004

Models: 200 HP 4 Stroke outboards

Units: 237

Problem: Incorrect flywheel casting composition could cause flywheels to come apart; possibility of injury to boat occupants

CARAVELLE POWERBOATS, INC.

(Americus, GA)(06R1292S)

Year: 2006

Models: 237 LS Bow Rider

Units: 49

Problem: Insufficiently sized openings in natural ventilation system

CARVER BOAT CORP.

(Pulaski, WI)(060049S)

Year: 1997 – 2007

Models: Mariner 350 and 360

Units: 914

Problem: Isolation bulkhead forward of engine compartment not completely sealed; possibility non-ignition-protected components could be exposed to fuel vapors

CORRECT CRAFT, INC.

(Orlando, FL)(050019T)

Year: 2005

Models: SV211 w/ serial nos.: 59109 - 59384 & 59388 - 59395

Units: 285

Problem: Ventilation; inadvertently mixed intake and exhaust ducts in the same plenum

DORAL INTERNATIONAL

(Grand Mere, QC)(050072T)

Year: 2003 – 2005

Models: Elegante 330SE w/ HINs:

CA-QJAD3182D303 –

CA-QJAD5226C505

Boca Grande 360SE w/ HINs:

CA-QJAE3092K203 –

CA-QJAE5189B505

equipped with Volvo 8.1 or Mercruiser
8.1 inboard engines

Units: 34

Problem: Missing “L” shaped support brackets could allow metal and semi-rigid rubber exhaust hoses to disconnect from each other sending raw cooling water and carbon monoxide into engine room

FOUNTAIN POWERBOATS

(Washington, NC)(06R1320S)

Year: 1993 – 2007

Models: 42 Lightning and 42 Executioner

Units: 361

Problem: Fuel lines from saddle tanks lack anti-siphon protection

FINELINE INDUSTRIES

(Merced, CA)(060058T)

Year: 2006 - 2007

Models: Centurion

Units: 293

Problem: Left and right tower Heim bolt on Evolution Towers may pull out causing tower to fall into cockpit; possible injury to operator and/or passengers

G3 BOATS

(Lebanon, MO)(060035S)

Year: 2006

Models: 1860WOFJ

Units: 29

Problem: Level Flotation

GEM PRODUCTS, INC.

(Orange Park, FL)

The plastic portion of vented fuel fills (99800, 99820, 99840, 99860 series) manufactured by Gem Products, Inc. may crack during fueling; possible fuel discharge into bilges; possible fire/explosion if ignition source present. The letters “PAT. PEND” are visible on the flange of recalled products. The following companies are involved:

CHAPARRAL BOATS, INC.

(Nashville, GA)(060065T)

Year: 2006 - 2007

Models: 190 SSI, 204 SSI, 210 SSI, 215 SSI,

220 SSI, 235 SSI, 236 SSI, 246 SSI,

255 SSI, 256 SSI, 260 SSI, 265 SSI,

275 SSI, 276 SSI, 280 SSI, 285 SSI,

236 SSX, 256 SSX, 276 SSX,

240 Signature, 270 Signature,

276 Signature, 280 Signature,

290 Signature, 310 Signature,

330 Signature, 350 Signature,

214 Sunesta, 216 Sunesta, 232 Sunesta,

234 Sunesta, 236 Sunesta, 252 Sunesta,

254 Sunesta, 274 Sunesta,

Units: 2,869

CHRIS CRAFT BOATS

(Sarasota, FL)(060067T)

Year: 2006 - 2007

Models: Speedster, Launch 22, Launch 25,

Corsair 25, Launch 28, Corsair 28

Units: 189

KENCRAFT MANUFACTURING, INC.

(Wilson, NC)(060070T)

Year: 2006 - 2007

Models: 2060, 2260, 2460

Units: 59

KENNER BOATS

(Knoxville, AR)(060081T)

Year: Mako 2201CC & 2201CCT boats built

Models: between 020306 - 090606;

Mako 1801CC boats built between

020306 - 090606;

Mako 1901CCV2, M1901CCT, &

M1901CC boats built between

020306 - 090606;

Mako 2101CCV2 & 2101CC boats built

between 020306 - 090606;

GEM PRODUCTS, INC. (cont'd)
(Orange Park, FL)

The plastic portion of vented fuel fills (99800, 99820, 99840, 99860 series) manufactured by Gem Products, Inc. may crack during fueling; possible fuel discharge into bilges; possible fire/explosion if ignition source present. The letters "PAT. PEND" are visible on the flange of recalled products. The following companies are involved:

KENNER BOATS (cont'd)
(Knoxville, AR)(060081T)

Tahoe 1950, 1960, 2150 & 2150CC
boats built between 020306 - 090606;
Kenner V2102 & V2102T boats built
between 020306 AND 090606;
Kenner 2103 & 2103T boats built
between 020306 & 090606;
Kenner 1800 & 1800T boats built
between 020306 & 090606;
Kenner V1902 & V1902T boats built
between 020306 AND 090606

Units: 654

MAKO MARINE INTERNATIONAL, INC.

(Forest City, NC)(060071T)

Year: 2007
Models: M184CC, M204CC
Units: 21

MONTEREY BOATS

(Williston, FL)(060074T)

Year: 2006 - 2007
Models: 234 FSX
Units: 43

NAUTIC STAR BOATS

(Amory, MS)(060075T)

Year: 2007
Models: 1800 Nautic Bay, 1900 Nautic Bay,
2110 Nautic Bay, 2200 Nautic Bay,
2000 Offshore, 205DC Sportdeck,
206 I/O Sportdeck, 210DC Sportdeck,
200SC Sportdeck, 210 Sportdeck,
230 Sportdeck, 2110 Tunnel,
2000 OS DC, 206 I/O Sportdeck,
210 I/O Sport, 210DC I/O Sportr,
230SL I/O Sport

Units: 202

OCEAN MASTER MARINE

(West Palm Beach, FL)(060076T)

Year: 2006 - 2007
Models: Ocean Skiff & Center Console
Units: 34

PARKS MANUFACTURING, INC.

(Seminole, OK)(060063T)

Year: 2007
Models: 2200 Pure Bay & 220 V-BAY LC
Units: 84

ROBALO BOATS LLC

(Nashville, GA)(060066T)

Year: 2006 - 2007
Models: R200, R220, R227, R240, R245, R260,
R265, R295, R300, R305
Units: 225

SEA HUNT BOAT MANUFACTURING

(Lexington, SC)(060077T)

Year: 2007
Models: 240 CC
Units: 12

SUNDANCE BOATS, INC.

(Blackshear, GA)(060079T)

Year: 2005 - 2007
Models: Skiff
Units: 147

TIDEWATER BOATS

(Irmo, SC)(060080T)

Year: 2006 - 2007
Models: 18, 19 & 21 Bay; 216 CC
Units: 153

GLASTRON BOATS

(Little Falls, MN)(050027T)

Year: 2005
Models: DS 215
Units: 72
Problem: Possible puncture in fuel tank during
installation of changing room drain; possible fire/
explosion if ignition source present

HUNTER MARINE

(Alachua, FL)(060053T)

Models: H240 w/ HINs:
 HUN24462F203 – HUN24516C404
 H260 w/ HINs:
 HUNF0027A202 – HUNF0140B404
 H270 w/ HINs:
 HUNK0162F102 – HUNK0173D304
 H27 w/ HINs:
 HUN27101G405 – HUN27105J405
 H306 w/ HINs:
 HUN30465F102 – HUN30568C404
 H326 w/ HINs:
 HUN32255F102 – HUN32362I304
 H33 w/ HINs:
 HUN33101I304 – HUN33258J405
 H356 w/ HINs:
 HUN35101F102 – HUN35421F304
 H36 w/ HINs:
 HUN36101F304 – HUN36231J405
 H38 w/ HINs:
 HUN38101C405 – HUN38145J405
 H386 w/ HINs:
 HUN38718E102 – HUN38836C405
 H410 w/ HINs:
 HUN41332K102 – HUN41357H203
 H41 w/ HINs:
 HUN41101J102 – HUN41218J405
 P420 w/ HINs:
 HUN42189J102 – HUN42230J304
 H426/44 aft cockpit w/ HINs:
 HUN4A101G203 – HUN4A155J405
 H426/44 deck salon w/ HINs:
 HUN40101D203 – HUN4D196J405
 P450/456 w/ HINs:
 HUN45272J102 – HUN45315I405
 P460/466/46 w/ HINs:
 HUN46270G203 – HUN46337J405

Units: 1,650

Problem: On ball valves manufactured by Marine Hardware (with blue handles), ball valve stem corrodes prematurely making it impossible to close the valve; possible water leakage

INDMAR PRODUCTS COMPANY, INC.

(Millington, TN)(060086T)

Year: 2005 - 2006

Models: GM 8.1L engine

Units: 998

Problem: Retainer clip for fuel rail damper not properly heat treated and may fracture; possibility of fuel leakage; possible fire/explosion if ignition source present

IMAR GROUP

(Fargo, ND)(06R1393S)

Year: 2006

Models: Gekko Revo 6.7

Units: 24

Problem: Display of capacity information; various electrical, fuel and ventilation system noncompliances

KAWASAKI MOTORS CORPORATION

(Santa Ana, CA)(050045T)

Year: 2004 – 2005

Models: JT900, JT1200 & JT1500

Units: 13,493

Problem: Hose from freshwater flush fitting to the engine may have a loose connection filling engine compartment with water

KAWASAKI MOTORS CORPORATION

(Santa Ana, CA)(050046T)

Year: 2005

Models: JT900-E2 w/ HINs:

US-KAW60001I405 - KAW61899E505

JT1200-C2 w/ HINs:

US-KAW30001I405 - KAW30253B505

JT1200-D1 w/HINs:

US-KAW40001J405 - KAW43217E505

JT1500-A2 w/HINs:

US-KAW50001E505 - KAW53531E505

Units: 6,718

Problem: Seat may not latch securely and might come off unexpectedly

KEVCON CORP.

(Fort Dodge, IA)(050023S)

Year: 1996 – 2004

Models: Stealth 145C, 1237 Jon & 1437 Jon sold under Brand Name Misty Harbor

Units: Stealth 145C – 147 boats w/ HINs:

KEIS0118C000 – KEIS0575F405

1237 Jon – 124 boats w/HINs:

KEIE0124K203 – KEIE0628K203

1437 Jon — 141 boats w/HINs:

KEIE0109E697 – KEIE0672G405

Units: 412

Problem: Level Flotation

KODIAK MARINE

(Tualatin, OR)(060085T)

Year: 2005 - 2006

Models: GM 8.1L engine

Units: 57

Problem: Retainer clip for fuel rail damper not properly heat treated and may fracture; possibility of fuel leakage; possible fire/explosion

LARSON BOATS

(Little Falls, MN)(060111T)

Year: 2007

Models: SEi-180 I/O & Escape 204

Units: 115

Problem: Dash fuse panel supply wire is undersized allowing for greater than three percent minimum voltage drop to critical components; possible tripping of the engine circuit breaker leaving ignition system with no power

LUHRS CORP.

(St. Augustine, FL)(060032T)

Year: 2006

Models: 28 Open

Units: 50

Problem: Bilge pump thru-hull placement lacks anti-siphon protection

MALIBU BOATS, INC.

(Merced, CA)(060087T)

Year: 2007

Models: Wakesetter 21.5 XTi

Wakesetter 21.5 VLX

Wakesetter 23 LSV

Wakesetter 247 LSV

Wakesetter VTX

Anniversary Response

Anniversary Wakesetter

Sunscape 21.5 LSV

Sunscape 23 LSV

Sunscape 247 LSV

vRide

Response LXi

Units: 353

Problem: Possible fuel leak around mounting area of in-tank fuel pump; possible fire/explosion if ignition source present

MASTERCRAFT BOAT COMPANY

(Vonore, TN)(050037T)

Year: 2005

Models: Maristar & X-30

Units: 84

Problem: Fuel tank may come in contact with transmission coupler abrading outside of tank; possibility of fuel leakage and possible fire/explosion if ignition source present

MERCURY MARINE

(Fond du Lac, WI)(050005T)

Year: 2003 – 2005

Models: 225 V-6 EFI 4-Stroke outboards w/ serial nos: 0T653945 - 1B055871

Units: 3,685

Problem: Throttle may stick preventing operator from shifting into neutral

MERCURY MARINE

(Fond du Lac, WI)(060090T)

Year: 2005 – 2006

Models: GM 8.1L engine

Units: 11,183

Problem: Retainer clip for fuel rail damper not properly heat treated and may fracture; possibility of fuel leakage; possible fire/explosion if ignition source present

MERCURY MARINE

(Fond du Lac, WI)(050014T)

Models: Bravo X I/II/III Drives w/ serial nos. 0W250000 thru 0W266345

Bravo XR I/III Drives w/ serial nos.

0W240000 thru 0W240652

Units: 2,655

Problem: Shift link bar may become disengaged from shift lever resulting in loss of shift control; possibility of collision

MERCURY MARINE

(Fond du Lac, WI)(060097T)

Year: 2006

Models: 25/30 EFI 4-Stroke outboards w/ serial nos.:

0R125005 - 0R145228

Units: 2,430

Problem: Throttle may not return to neutral after running at elevated rpms resulting in loss of shift control; possibility of collision

MERIDIAN YACHTS

(Everett, WA)(050024T)

Year: 2005

Models: 341, 368, 381, 408, 411, 459, 490

Units: 53

Problem: Stainless rudder bearings seize on rudder shaft; possibility of collision

MERIDIAN YACHTS

(Everett, WA)(050055T)

Year: 2004 – 2006

Models: 408, 411 & 459

Units: 172

Problem: Shore power plug ends on Glendenning Cable Master may have been installed incorrectly; possible fire/explosion if fuel or vapor source present

PANTHER AIRBOAT CORP.

(Cocoa, FL)(060095T)

Models: Airboats equipped with GM 8.1L engine

Units: 50

Problem: Retainer clip for fuel rail damper not properly heat treated and may fracture; possibility of fuel leakage; possible fire/explosion if ignition source present

PLEASURECRAFT ENGINE GROUP

(Little Mountain, SC)(060083T)

Year: 2005 - 2006

Models: GM 8.1L engine

Units: 1,005

Problem: Retainer clip for fuel rail damper not properly heat treated and may fracture; possibility of fuel leakage; possible fire/explosion if ignition source present

RANGER BOATS

(Flippin, AR)(060102T)

Year: 2006 - 2007

Models: 175VS, 178VS, 180 RE, 185 VSI, 188 IN, 188VS, 190 RE, 195'V, 1750R, 1760', 1850 R, 1860VS, 2000', 618VS, 619VS, 519VX, Z19'0

Units: 273

Problem: Main battery cable routed incorrectly and could interfere with outboard engine flywheel on boats rigged with Bombardier 115, 150, 175 or 200 HP engines; possible short circuit; possible fire/explosion if fuel or vapor source present

REGAL MARINE INDUSTRIES

(Orlando, FL)(06R1557S)

Year: 2007

Models: Regal 2700

Units: 60

Problem: Continuously energized ungrounded terminals on battery switch not protected from accidental short circuiting; all-round navigation light obstructed by bimini top

S2 YACHTS, INC.

(Holland, MI)(060019S)

Year: 2004 – 2006

Models: 3200 Open

Units: 86

Problem: Engine compartment blowers insufficient size

SEA BOSS BOATS

(Newberry, SC)(050029T)

Year: 2003 – 2004

Models: 180CC w/ HINs:

GHQCW001A303 - GHQCW298E404

190CC w/ HINs:

GHQJR001A303 - GHQJR210E404

210CC w/ HINs:

GHQTT001L202 - GHQTT174E404

210WA w/ HINs:

GHQKL001L203 - GHQKL121E404

235CCF w/ HINs:

GHQJR001G304 - GHQJD024C404

235WAF w/ HINs:

GHQLF001G304 - GHQLF017C404

19 BAY w/ HINs:

GHQ FC001A303 - GHQFC060H304

19 BAY w/ HINs:

GHQFN001G304 - GHQFN054E404

21 BAY w/ HINs:

GHQKB001G304 - GHQKB085E404

Units: 1,054

Problem: ABS thru-hull fitting manufactured by T-H Marine Supplies reacts with PVC hose causing fitting to fail; possibility of sinking

SEA PRO BOATS

(Newberry, SC)(050067S)

Year: 1999 – 2006

Models: S195FS w/ HINs:

PIOFS101K899 – PIOFS713F506

S195FS w/ HINs:

PIOFS001G506 – PIOFS022J506

Units: 620

Problem: Level Flotation

SEA PRO BOATS

(Newberry, SC)(050068S)

Year: 2002 – 2006

Models: SV1500C w/ HINs:

PIONG001G102 – PIONG180F506

Units: 180

Problem: Level Flotation

SEA RAY BOATS

(Knoxville, TN)(060110T)

Year: 2007

Models: 2150 & 270 SLX

Units: 313

Problem: AC & DC Electrical Systems do not have common ground as required by ABYC E-11. If a short occurs in the shore power system, possibility of stray current into the water around the boat

SMOKER CRAFT

(New Paris, IN)(050007T)

Year: 2000 – 2004

Models: Various

Units: 5,314

Problem: Ignition switch defective and could short; possible fire/explosion if fuel or vapor source present

SMOKER CRAFT, INC.

(New Paris, IN)(050016S)

Year: 2004 – 2005

Models: 20-foot Deck Boat

Units: 115

Problem: Decorative grills on natural ventilation supply and exhaust openings reduce cross-sectional area below minimum requirements

STARCRAFT MARINE

(Topeka, IN)(05R0466S)

Year: 2005

Models: Aurora 2000 I/O

Units: 556

Problem: Decorative grills on natural ventilation supply and exhaust openings reduce cross-sectional area below minimum requirements

SUNSATIION PERFORMANCE BOATS

(Algonac, MI)(06R1738S)

Year: 2007

Models: 32-foot inboard

Units: 102

Problem: Missing manually reset, trip-free circuit breaker or fuse on some ungrounded current carrying conductors

TELEFLEX CANADA

(Richmond BC)(050028T)

Year: 2005

Models: Seastar Tubing w/ lot nos.:
71335 to 71336

Baystar Tubing w/ lot nos.:
71335 to 71336

Units: 19,000 Seastar & 1,096 Baystar

Problem: Tubing may burst prematurely; potential loss of steering control

VOLVO PENTA OF THE AMERICAS, INC.

(Chesapeake, VA)(060084T)

Year: 2005 - 2006

Models: GM 8.1L engine

Units: 1,749

Problem: Retainer clip for fuel rail damper not properly heat treated and may fracture; possibility of fuel leakage; possible fire/explosion if ignition source present

WESTERBEKE CORPORATION

(Taunton, MA)(050026S)

Year: 2003 - 2005

Models: Generators – 5.0 BCG, 5.0 BCGA,
7.0 BCGC, 7.0 BCGD, 8.0 BEG,
10.0 BEG, 12.5 BEG, 15.0 BEG,
20.0 BEG, 20.0 BEGA, 25.0 BEG, &
25.0 BEGA

Units: 2,166

Problem: “On” toggle switch fails ignition protection test; possible fire/explosion if fuel or vapor source present

YAMAHA MOTOR CORPORATION

(Cypress, CA)(050010T)

Year: 2004 – 2005

Models: FX1100 WaveRunner

Units: 12,000

Problem: Parts of throttle body assembly, including the link lever may become corroded during storage if exposed to salt water; corrosion could prevent throttle return springs from returning linkage to the idle position; engine may be prevented from starting; or if engine is already running, throttle may stick open; possibility of collision

YAMAHA MOTOR CORPORATION

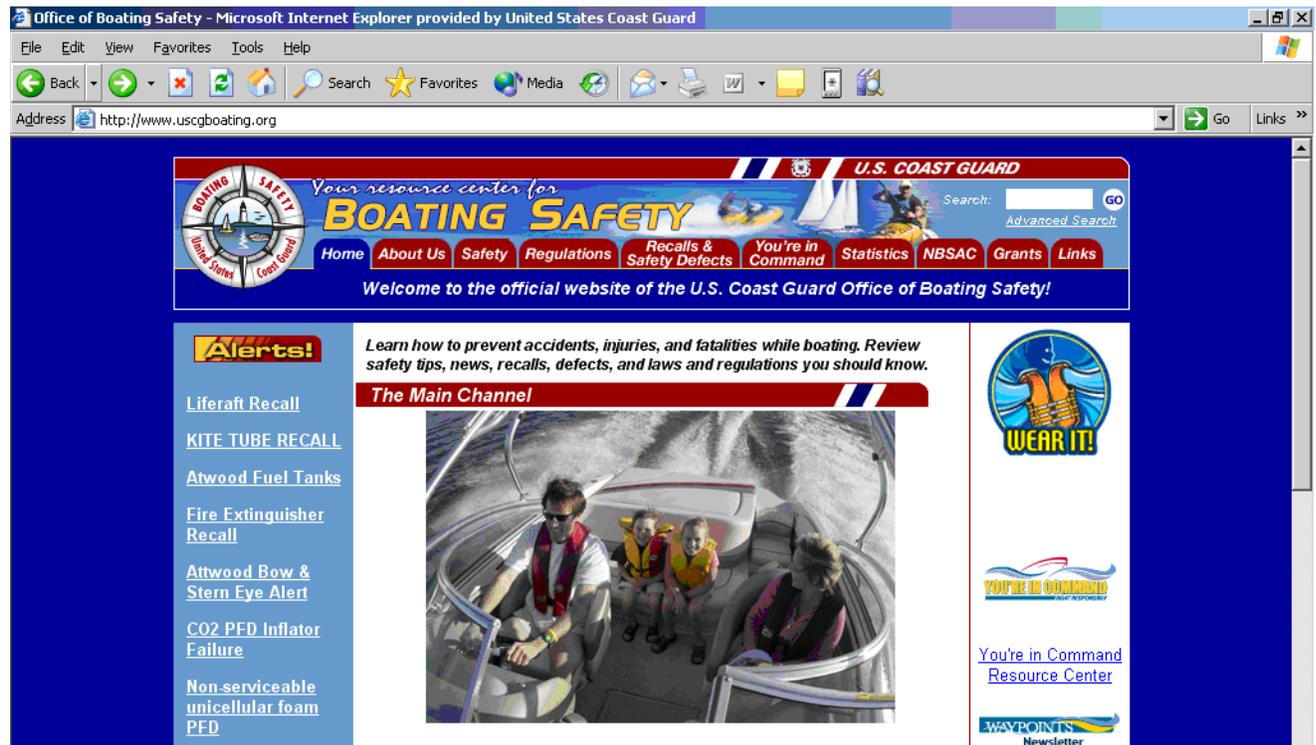
(Cypress, CA)(050051T)
 Year: 2005
 Models: VX1100 & VX1100A
 Units: 10,000

Problem: Corrosion on connector terminals of the rectifier and regulator assembly can cause excessive electrical resistance which can cause severe over-heating of the wire harness coupler that connects to the rectifier and regulator assembly – risk of fire; corrosion on certain parts of the accelerator position sensor assembly might prevent throttle return springs from returning accelerator cam to idle position

YAMAHA MOTOR CORPORATION

(Cypress, CA)(070002T)
 Year: 2005
 Models: 90TLR Outboard motors
 Units: 300

Problem: Possibility of oil pump mounting bolts to be loose; throttle link rod might catch on loose bolts causing throttle valve to stick in open position; possible loss of control and danger of collision



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