

ETHANOL FUEL

PROBLEMS & CUSTOMERS CONCERNS IN RECREATIONAL BOATING:

Prior to July 2006, the gas we were buying was called an “oxygenated” fuel that contained **MTBE** (Methyl Tertiary Butyl Ether). It was determined that MTBE contaminated our ground water and was banned in many states.

The gas you are buying no longer has MBTE. It was replaced by alcohol. Alcohol is mixed into the gas at 1 to 10 ratios to give it a higher octane than MBTE previously provided.

Ethanol, an alcohol derived primarily from corn, is both a domestically produced, and a renewable fuel. **E-10** (10% ethanol) has become the critical component of our fuel infrastructure. Ethanol has more operational and maintenance considerations for your boat.

WHAT’S THE PROBLEM?

The problem is all alcohols are **hygroscopic**. That means ethanol attracts and binds to water, resulting in greater amounts of water collecting in the fuel tank. Since water is heavier than gasoline, over a period of time (**usually between 60 to 90 days**) the water and ethanol mix settles to the bottom. This is referred to as “**phase separation**”. Eventually the water/ethanol mixture that settles in the bottom can be drawn into the fuel delivery system. If there is no water separator in the line, the water goes into the injector/carburetor and the engine does not run properly. In some cases, the engine will stop running. For automobiles, this is not a common problem in that an entire tank of fuel will most likely be used in less than 30 days, well before a water/ethanol build up takes place. Also, automobiles have smaller, and non-ventilated gas tanks, leaving less air space for condensation to accumulate. Boats usually have large gas tanks with open ventilation and do not use up their fuel for many weeks, if not months. When tanks are left low in fuel, they readily form condensation.

More information can be obtained by Googling “Ethanol problems in boats” for websites.

Lynnhaven Marine has assigned John Kully, in our Parts department, to stay current with the literature. John is available to answer your questions by phone or email, (parts@lynnhavenmarine.com). At times he will be busy and will return your call. Leave a detailed message on his voice mail (extension 317) and he should get back to you in 24 hours during the week.

1. WHAT KIND OF OTHER PROBLEMS WILL BOATERS FACE WITH E-10

- **LOSS OF POWER & PERFORMANCE**

Boaters will face a slight loss of power. Pure ethanol is over 100+ octane, and provides the fuel with much of its octane rating. Because Ethanol burns at a lower temperature than the older (MTBE) gas, boaters can expect to see a 2 to 3 % drop in RPM and fuel mileage

- **LOSS OF STRENGTH IN THE WALLS OF FIBERGLASS TANK**

Ethanol has been linked to weakening fiberglass gas tanks. Most gas tanks on boats are made from aluminum or plastic. Older boats and many high-end sport fishers were sometimes built with fiberglass gas tanks. Tests have confirmed that resins used in fiberglass tanks are leaching from the walls of the tanks into the fuel. This resin goes through the fuel system and sticks to valves and other internal engine parts. This buildup of resin deposits may cause bent pushrods and may cause clogged intake valves.

Any boat owner using a fiberglass (not plastic) gas tank will need to replace their fiberglass tank with either aluminum or plastic.

- **VARNISH / SLUDGE**

Ethanol is a powerful solvent and readily breaks up tars and organic sediment (SLUDGE) found in many marine fuel tanks.

The ethanol/water mix also makes a potent stripping agent for old varnish and gum accumulated from years of gasoline sitting in the tank. These organic contaminants, once loosened from tank walls, can plug filters and injectors quickly, disabling your boat's engine. In cold weather, the water/alcohol phase can also freeze, turning into a syrupy mix that plugs filters.

2. FILTERS, WHAT KIND DO I NEED & HOW OFTEN DO I NEED TO CHANGE THEM

TYPE OF FILTERS

- Use any manufacturer's 10 micron filters, such as Racor, Yamaha, and Mercruiser.
- You should install a remote filter system, if one is not already installed.

3. CHANGING FILTERS

- In the beginning you may have to change your filters quite a few times, until you have removed all varnish, water & sludge from your tank.
- Keep extra filters on your boat at all times
- If using Racer Spin-On filters with clear plastic bowls, keep a close eye on the plastic drain plug on the bottom of the bowl. There have been several complaints that gas was found leaking, with ethanol eroding the threads on the plastic drain plug on the bottom of the bowl. If this is a problem, one solution is to change to a Racor all-metal bowl with a brass plug.
- After your tank is clean of varnish and/or sludge, you should expect to change your filters at least 2 to 3 times a season. Always check for water in your tank. To do this, if you use a spin on type filter, take it off and pour its contents into a small glass jar. If you have a Racor spin-on type, loosen the drain plug and run the contents off into a glass jar. Do not dump fuel in bilge or used oil tank. If you are a Boatel guest, bring your jar to the Service department for disposal or if clean fuel, put back in the tank.
- If you don't want to tackle the cleaning of your tank, several local companies will clean your tank and return your ethanol fuel back to your tank cleaned of all impurities.

4. WINTERIZATION / 60 PLUS DAYS OF NON USE OF BOAT PHASE SEPARATION SOLUTIONS

- The” STAR TRON” additive will extend your ethanol fuel from phase separation for up to a year, per their literature.
- Ethanol fuel does not need any additives to keep from freezing in gas lines.

- **FUEL ADDITIVES**

Do not use alcohol-based additives, as this will only add to the ethanol problems. Use only non-alcohol based products such as Star Tron Gas Additive

OTHER CONCERNS:

5. PRE-MIXED FUEL

- Owners of older “Pre-Mixed” non-injected outboards should keep a watchful eye on the engine performance. If the engine seems to running hot, it may be from fact that ethanol does not mix well with oil and may tend to fall out of solution, causing your engine not to receive the proper amount of oil.

6. RUBBER PARTS

- Older marine engines (prior to 1991) may have issues with rubber parts (i.e. gas lines, gaskets & “o” rings) that may not be compliant with ethanol-based fuel. Keep a close eye on your filters to see if you are getting any black goo, which could mean your rubber parts are being eroded. You might have similar problems with an incorrect replacement part.

7. VAPOR LOCK

- Increased possibility with ethanol fuel. Not starting, hard to start and cutting off are all potential vapor issues.

8. CRUISERS TAKING LONG TRIPS

- Boaters, both Power & Sail (with gas engines) need to be aware of the problems they may face while cruising this summer. Not all marinas are using E-10 Ethanol gas yet. Once you have converted over to Ethanol, going back to the old style of “MBTE” gas may cause problems with water build up in their tanks and falling out of solution phase separation faster than normal. When planning your trip, it would be prudent to call ahead to the various marinas on your trip route to see what type of fuel they are offering and then plan accordingly.

9. CAN I USE E15 OR GREATER ETHANOL IN MY BOAT

- **NO: AT THIS TIME ONLY E-10 ETHANOL IS APPROVED USE IN THE MARINE INDUSTRY**

2. WHAT TYPE OF GAS TANK DO I HAVE, AND WHAT KIND PROBLEMS WILL I FACE?

1. ALUMINUM TANKS / STAINLESS

- REMOVES VARNISH, TAR AND CORROSION BUILD UP ON THE WALLS FROM OLD “MTBE” GAS

2. POLYETHYLENE TANKS

- WATER FROM CONDENSATION AND VARNISH.

3. FIBERGLASS TANKS

- VARNISH, SLUDGE

The residue created by the combination of the resin and ethanol result in terrible problems in the form of sludge, which if was not filtered out and reach the carburetors and engine cylinders, could cause extensive damage and repairs.

- DETERIORATION OF WALLS OF TANK

Ethanol attacks the resin in fiberglass tanks. As ethanol attacks the resin in these older tanks the walls became weaker and over time some walls failed to support the fiberglass cloth used to form the tank and some tanks start leaking fuel. For those few with fiberglass tanks, the only answer appears to be replacement of the tanks with one made from aluminum, stainless or plastic.

WHAT HAS LYNNHAVEN MARINE DONE?

We had in-ground fuel tanks inspected for water before we started using the ethanol fuel. Our automatic fuel sensor system was also inspected at this time and the water detection alarms were accurate. Our automatic fuel sensor system will tell us if water is present in the tanks or any other problem with our fuel. A fuel system print out is done each day and reviewed by our operations staff every morning.

We also filter the fuel for contaminants. Our operations staff routinely checks these filters. We also stock these filters and have assigned a staff member to stay current with the information processed by our automatic fuel sensor system monitor.

We have never had a water issue in our tanks for over 15 years.

We are taking a proactive approach to learning all we can to help provide general guidance to our customers.

ETHANOL FUEL

We have attempted to collect and consolidate information about ethanol and its use in your boat. This document might not cover all situations and is simply information to cause you to seek particular recommendations from your manufacturer or boat builder. Lynnhaven will attempt to provide you the best information but cannot be held responsible for **possibly providing** the wrong advice for a particular boat or engine. The type and quality of hoses, tanks, and installations varies by manufacture and year. The impact of the Ethanol also varies and it is difficult to have the correct answer and solution 100% of the time. You need to research all options before you make your own decision related to Ethanol and your boat.

If you have any concerns, smell fuel in or around your boat contact the boatel or service staff. After hours call Chuck at 757-287-3161 with any emergency concerns.

QUESTIONS

What type of Fuel/Water Separator filters and how much to install?

Any manufactures fuel/water separator filter that is **10-micron and will allow the proper fuel flow to your engine**. They can be Racor Spin-on type with either a clear plastic or metal bowl or they can be the “Oil filter type canister” as long it is a 10-micron filter (some generic filters are 21 to 29 microns and will pass to much of the contaminates to the engine, which may cause extensive and costly damage).

Installation should between 1 to 2 hours plus parts, depending on the access to the mounting location. Call Service for estimates for your boat.

Where do I dump the gas from my filters?

When you are checking fuel from your filter you need to pour the fuel into a glass jar for inspection. BE VERY CAREFUL NOT TO SPILL FUEL IN YOUR BILGE AND FOLLOW EXTREEM SAFETY PROCEDURES WHEN HANDLING GAS. You can bring your glass container to our service OR parts department for comment and disposal. Do not dump fuel in the water, on the ground or in the disposal oil tank.

If your filter clogs while out on the water, stop & turn of the engine. Remove the filter, dump fuel in a safe container and place the filter into a plastic zip lock bag and install a new filter (using Ethanol fuel, you should carry extra filters on board at all times). In some instances you may have to fill your new filter with some fuel to help the pump get fuel to your engine. When you return from your trip, bring your old filter to the service department at Lynnhaven Marine or to a gas station for disposal.

My boat is older than 1991. What do I do?

Pre 1991 boats and motors may have rubber hoses and gaskets that may not be compatible with Ethanol fuel. Boaters should keep a close

eye on the fuel running through their filters. If you start to see black “goo” in your filters, you may need to replace any rubber parts that the Ethanol comes into contact with. You need to inspect your bilge for the smell of fuel from possible leaks. Never turn on your bilge pump fuel over board. Contact our service department with questions. If you are a Boatel guest advise Boatel or launch staff of any fuel smells or leaks. Staff will isolate your boat outside of the boatel and send you to service department to review your options.

Could my motor just stop running because of the new fuel?

Yes, but for many reasons. After the initial steps to clean your old fuel tanks (unless older fiberglass tanks) of varnish and sludge, you should only need to worry about the amount of water in you tank. Non-alcoholic products, like Star-Tron, will help burn excess water and extend the shelf life of ethanol in your tank to a year (read company information to understand how this works). Engines can stop due to vapor lock which can be caused by many issues that were not a problem with MBTE based fuels.

Does ethanol affect my warranty?

As of the mid 1990’s all marine engine manufactures have stated that all their outboard or Inboard-outboards will work with Ethanol as long it is 10% or less by volume. The issue is usually the delivery of fuel to the engine.

Are repairs or changes because of Ethanol covered under warranty?

The answer is NO. Typically, all the responsibility for keeping your fuel clean of sludge and water free is the responsibility of the boat owner. Some boat manufactures either install a larger fuel water separator or offer it as an option. For the boat owner who doesn’t have one, they can be purchased at Lynnhaven Marine Parts department or at any marine supply store. The boat owner needs to keep in mind that all engine manufacture recommends no larger than 10 Micron filter. Some third

party manufactures make replacement filters for Mercury, Mercursier, Volvo, Yamaha and Johnson & Evinrude that are greater than 10 micron. If you are using a filter that is greater than 10 micron there is a good chance that they will pass contaminates to the engine, which may cause extensive and costly damage.

Boat manufactures have not covered fuel system modification to compensate for Ethanol. The government also does not assume any responsibility.

Why does phase separation take 60 to 90 days?

Actually, phase separation is not time dependent. With enough water in the fuel (1/2% of volume), phase separation will start. The octane will drop when the water/Ethanol mixture sinks to the bottom of the tank. Because the water/Ethanol is in the bottom this damaging mixture will be the last to be drawn into the engine. Usually performance will drop and pinging or engine knock will occur first to give you an indication of a problem. If you have a performance drop stop running the engine as soon as possible and contact your marine mechanic (See product handout that comes with non-alcohol based additives.)