

CIRCULATE TO:  
SERVICE MANAGER   
PARTS MANAGER   
MECHANICS   
"Place In a Service  
Bulletin Binder"

## **NO LEAD GASOLINE/ALCOHOL BLENDS and GASOLINE RECOMMENDATIONS**

### **LEAD**

Recent regulations by the U.S. Environmental Protection Agency (EPA) and the Canadian government have required the removal of lead (anti-knock compound) from all gasoline by 1988 due to the lead emission in exhaust being a health hazard.

In order to maintain octane ratings, many gasoline manufacturers are adding ethyl alcohol (ethanol) or methyl alcohol (methanol) to the gasoline to replace the lead. Since 1960, Mercury Marine has recommended operation of all Mercury outboards on any good grade regular leaded, premium, low-lead or lead-free gasolines with a minimum posted average octane rating of 86, (research octane rating of 90). All Mariner outboards have the same recommendations since their U.S. introduction in 1976.

Since 1975, Mercury Marine has recommended operation of MerCruiser marine engines with any good grade regular leaded, premium, low-lead or no-lead gasolines with a minimum average octane rating of 88. Prior to that time, recommendations were to use one tank of leaded gasoline for every four tanks of no-lead gasoline. Mercury Marine has recently amended its fuel recommendations for MerCruiser engines.

**NO LEAD GASOLINE WITH A MINIMUM POSTED AVERAGE OCTANE RATING OF 86, MAY BE USED IN MERCURY AND MARINER OUTBOARD MOTORS AND MERCURISER MARINE ENGINES AS STATED ABOVE. (HI-PERFORMANCE MODELS ARE EXCEPTIONS.)**

### **ALCOHOL**

The following are current recommendations as to gasolines containing alcohol and will be placed in all future operation and maintenance manuals (owner's manuals).

### **GASOLINE RECOMMENDATIONS**

The use of any good grade regular leaded, premium, low-lead or lead-free automotive gasolines with a minimum posted octane rating of 86 (research octane number 90), are satisfactory for use in MerCruiser marine engines. [Hi-Performance models: Minimum posted octane rating of 88 (research octane number 93). If 88 octane is not available, a gasoline with an average octane rating as low as 86 (research octane number 90) may be used; however, ignition timing must be retarded 4° to prevent harmful detonation.]

However, gasolines containing alcohol, either methyl alcohol (methanol) or ethyl alcohol (ethanol) may cause increased:

- Corrosion of metal parts
- Deterioration of elastomer and plastic parts
- Fuel permeation through flexible fuel lines
- Wear and damage of internal engine parts
- Starting and operating difficulties.

Some of these adverse effects are due to the tendency of gasolines containing alcohol to absorb moisture from the air, resulting in a phase of water and alcohol separating from the gasoline in the fuel tank.

The adverse effects of alcohol are more severe with methyl alcohol (methanol) and are worse with increasing alcohol content.

### **▲WARNING**

**FIRE AND EXPLOSION HAZARD:** Fuel leakage from any part of the fuel system can be a fire and explosion hazard which can cause serious bodily injury or death. Careful periodic inspection of the entire fuel system is mandatory, particularly after storage. All fuel components including fuel tanks, whether plastic, metal or fiberglass, fuel lines, fittings, fuel filters, fuel pumps and carburetors should be inspected for leakage, softening, hardening, swelling or corrosion. Any sign of leakage or deterioration necessitates replacement before further engine operation.

Because of the possible adverse effects of alcohol in gasoline, it is recommended that only alcohol free gasoline be used where possible. If only alcohol containing fuel is available, or if the presence of alcohol is unknown, then increased inspection frequency for leaks and abnormalities is required.

## **GASOLINE/ALCOHOL BLENDS**

Many new motor vehicle owner manuals are warning about the potential damage from using gasoline containing alcohol, especially **METHANOL**. They cite possible fuel system damage and performance problems. These are just two of the hazards that may be caused by alcohol. These same problems as well as the additional safety risk of fire and explosion from fuel system leaks apply to outboards and marine inboard engines. **METHANOL** is more severe in its bad effects than is **ETHANOL**. Alcohol is also more severe in older engines since newer engines have materials which are more resistant to alcohol.

## **EFFECTS OF GASOLINE/ALCOHOL BLENDS ON MARINE ENGINES**

Corrosion of metals may result from use of alcohol-gasoline blends. Portable or permanently installed fuel tanks of metal or fiberglass, fuel filters, fuel lines and float bowls may be affected by alcohol blended fuels. Many fiberglass fuel tanks are slowly dissolved by alcohol, leading immediately to filter and carburetor plugging and eventually to fuel tank failure.

Alcohol containing fuels will absorb moisture from the air. At first, this moisture will remain in solution, but once the water content of the fuel has built up to about one-half of one percent, it will separate out, (phase separation) bringing the alcohol with it. This alcohol-water mixture settles to the bottom of the fuel tank and if this mixture gets into the engine, engines can be seriously damaged internally, as it may wash the protective film of oil off the bore of any cylinder that it enters. Before the engine can be restarted, it is necessary to remove the separated alcohol and water layer, flush out the fuel system with clean fuel and remove and dry the spark plugs.

### **BOAT/MOTOR STORAGE**

When operating a MerCruiser on gasoline containing alcohol, storage of gasoline in the fuel tank for long periods of time should be avoided.

Long periods of storage, common to boats, create unique problems. In cars, gasoline/alcohol blend fuels normally are consumed before they can absorb enough moisture to cause trouble, but boats often sit idle long enough for phase separation to take place. In addition, internal corrosion may take place during storage if alcohol has washed protective oil films from internal components.

### **WINTER STORAGE**

If boat is to be placed in winter storage, carburetors must be run dry at idle RPM. Permanent fuel tanks should be drained completely and Quicksilver Gasoline Stabilizer and Conditioner added to any fuel remaining in the tank. Portable fuel tanks should be emptied completely.

It is also recommended to coat the internal engine parts with Quicksilver Storage Seal. Follow the directions on the container. This coating will reduce possibilities of internal parts becoming rusted from moisture accumulation during storage.

### **WARRANTY**

Performance problems, fuel system or other damage resulting from the use of gasoline-alcohol blended fuels is not the responsibility of Mercury Marine and will not be covered under our warranty.

### **CONTINUING EVALUATIONS**

The effects of gasoline blended with ETHANOL and METHANOL are still being evaluated by the United States Coast Guard, the National Marine Manufacturers Association (NMMA), Mercury Marine and other engine and boat manufacturers.

We have recommended pump posting of alcohol content of gasoline. Further we recommend using gasoline known not to contain any METHANOL or ETHANOL when possible.

## TEST FOR ALCOHOL CONTENT IN GASOLINE

The following is an acceptable and widely used field procedure for the detection of alcohol in gasoline. (Outboard motors only: It should be conducted on the fuel **before the addition of oil** as the oil may obscure any change in separation level.) Use any small transparent bottle or tube that can be capped and is or can be provided with graduations or a mark at about 1/3 full. A pencil mark on a piece of adhesive tape may be used.

### PROCEDURE

1. Fill the container with water to the mark.
2. Add fuel almost to fill the container, leaving some air space, and then cap the container. The proportions of fuel to water are not critical, but there should be 2-3 times as much fuel as water.
3. Shake container vigorously and allow it to sit upright for up to about 3-5 minutes. **If the volume of water appears to have increased, alcohol is present.** If you are not sure, there is not enough to be of concern. If the dividing line between water and fuel becomes cloudy, use the middle of the cloudy band.