



# service bulletin

No. 93-3

## Fuel Recommendation – 2 thru 275

Mariner, Mercury and Force

The new gasoline recommendation has been constructed and is printed on the last page of this bulletin and on the wall poster enclosed. You are encouraged to convey the new recommendations to your customers to ensure their boating pleasure.

The new recommendation is necessary because of changes in the chemical composition of gasoline that has occurred since the previous recommendation was printed. The previous gasoline recommendation printed in 1985 is no longer valid and should be destroyed.

### MAJOR CHANGES/ADDITIONS:

#### Oxygenated Gasolines - MTBE, Ethanol, and Methanol:

Oxygenated gasolines are in use and may be required to be used by US Federal Law in Environmental Protection Agency designated carbon monoxide non-attainment zones. Oxygenation, as the word implies, adds oxygen to the gasoline. The advantage of oxygenated gasoline is that it produces harmless carbon dioxide instead of hazardous carbon monoxide when it burns. However, as a general note, gasoline containing oxygenates has less energy and can cause a highly tuned engine to run leaner. Today's gasolines can be oxygenated by the addition of chemicals such as MTBE, ethanol, or methanol. MTBE, in normal concentrations has no known affect, except producing less energy, when used in current or older Force, Mariner, and Mercury outboards. However, gasolines containing ethanol or methanol can have adverse affects on marine engines. Gasoline that contains ethanol or methanol absorbs water from the air. With time, this accumulation of water can be drawn into the engine and cause poor performance and serious damage to the engine. Ethanol, and to a greater extent, methanol, forms an organic

acid that can deteriorate elastomer and plastic parts, such as gaskets, seals, and hoses, and can cause fuel leaks in older outboards. This acid can also dissolve and loosen fuel system deposits and the debris can plug up carburetor jets and fuel filters.

Outboards built since 1980 may use gasoline containing up to 10% ethanol, but the addition of a Quick-silver Water Separating Fuel Filter is recommended. The fuel filter will trap water and dissolved deposits and debris. The water separating fuel filter DOES require periodic maintenance.

Outboards built prior to 1980 may also use gasoline with up to 10% ethanol with the recommended Quick-silver Water Separating Fuel Filter. However, additional inspection of the fuel system is required to detect and correct deterioration of elastomer and plastic parts, such as hoses, seals, and gaskets caused by the alcohol and acids in the gasoline.

Gasolines containing methanol should be avoided whenever possible because of the stronger organic acids that can be formed.

Marinas may be exempt from selling oxygenated fuels. Customers should be advised to inquire what gasolines are available from both marinas and the service stations.

#### Premium Gasoline:

We are discontinuing our recommendation of using premium unleaded gasoline because many are blended with components (oxygenates, ethers, butane, etc.) which primarily raise the research octane number only. Force, Mariner, and Mercury outboards respond most favorably to a higher motor octane number. Pump octane (pump posted) is determined by adding the research octane and the motor octane and then divide by 2 ( $R + M \div 2$ ). If the outboard is used in severe service or hard working conditions (skiing, large boats, heavy loads, etc.) or if detonation

is suspected to be caused by poor grade gasolines, use mid-grade (89 - 91 pump octane) unleaded gasoline supplied by a major name brand company. If detonation persists, check for improper cooling, a lean fuel mixture and/or incorrect ignition timing.

**Carbon Deposits:**

Today's gasolines can leave significant amounts of carbon deposits when used in two cycle outboard engines. Carbon deposits can cause piston ring sticking and/or piston ring "jacking" and may contribute to powerhead failure. Encourage the use of gasoline that has fuel injector cleaner added at the factory to control carbon deposits which results in a cleaner and more efficient engine. Caution your customers on the use of fuel injector cleaners that are manually added to the gasoline as the mixture ratio is critical to controlling carbon deposits. Also, if too much cleaner is added, engine damage may result due to the removal of some of the lubricating properties of the oil.

Use Quicksilver 2-Cycle Outboard Oil to help control carbon deposits.

- Quicksilver Certified TC-WII Outboard Oil is an industry leading oil that provides superior outboard lubrication and resistance to carbon buildup when used with good grades of gasoline.
- Quicksilver Certified TC-W3 Outboard Oil is a higher grade oil that provides increased lubrication and extra resistance to carbon buildup when used with good or varying grades of gasoline.

Use Quicksilver Quickleen P/N 92-824074A12 to periodically clean up internal carbon deposits.

**Gasoline Storage:**

Use a major name brand of gasoline from an outlet that sells a large amount of fuel. Fuel stored longer than 15 days may have lost some of the desired properties (dependent on temperature and storage conditions). Plan to use up the fuel in one to two months after purchase.

Always keep the vent closed on portable fuel tanks when not in use to prevent air exchange and water absorption.

Store fuel in a cool/dry area.

Use Quicksilver Fuel System Treatment and Stabilizer 92-78383A12 and Gasoline Stabilizer p/n 92-817529A12 to prevent unused gasoline from losing desired properties during periods of non-use (15 days or more).

## USA AND CANADA GASOLINE RECOMMENDATIONS

### ALL FORCE, MARINER, AND MERCURY OUTBOARDS

ANY MAJOR BRAND OF UNLEADED (LEAD-FREE) AUTOMOTIVE GASOLINE WITH A MINIMUM PUMP POSTED OCTANE RATING (R + M ÷ 2) OF 87 IS SATISFACTORY FOR THESE OUTBOARDS. Outboards may use gasoline containing up to 10% ethanol, but the addition of a Quicksilver Water Separating Fuel Filter\* is recommended. Mid-grade AUTOMOTIVE GASOLINE advertised to contain fuel injector cleaning agents is recommended for added internal engine cleanliness. Hi-Performance models-refer to the gasoline recommendations furnished with these engines.

\* The water separating fuel filter will trap water and dissolved deposits and debris. The filter DOES require periodic maintenance. Ask your dealer for maintenance and installation details.

#### 1979 and older:

Additional inspection of the fuel system is required to detect and correct deterioration of elastomer and plastic parts, such as hoses, seals and gaskets caused by the alcohol and acids in the gasolines.

Oxygenated gasolines are in use and may be required to be used by US Federal Law in Environmental Protection Agency designated carbon monoxide non-attainment zones. Oxygenation, as the word implies, adds oxygen to the gasoline. The advantage of oxygenated gasoline is that it produces harmless carbon dioxide instead of hazardous carbon monoxide when it burns. However, as a general note, gasoline containing oxygenates has less energy and can cause a highly tuned engine to run leaner. Today's gasolines can be oxygenated by the addition of two different classes of oxygenates: alcohols and ethers.

#### GASOLINE/ALCOHOL BLENDS:

Gasolines containing alcohol, either ethyl (ethanol) or methyl (methanol) absorbs water from the fuel tank and the air. With time, the alcohol/water can separate from the gasoline and settle to the bottom of the fuel tank. From there, it can be drawn into the engine and cause poor performance and serious damage to the engine. Ethanol, and to a greater extent, methanol, forms an organic acid that can attack metal parts and

deteriorate elastomer and plastic parts such as gaskets, seals, and hoses, and can cause fuel leaks in older outboards. This acid can also dissolve and loosen fuel system deposits and the debris can plug up the carburetor jets and fuel filters.

Gasoline containing methanol should be avoided whenever possible because of the stronger organic acids that can be formed.

#### GASOLINE/ETHER BLENDS:

Gasoline containing methyl tertiary-butyl ether (MTBE) in normal concentrations has no known affect, except producing less energy.

#### CARBON DEPOSITS:

Use gasoline that has fuel injector cleaner added at the factory to control carbon deposits which results in cleaner internal engine components and more efficient operation. Caution should be used when manually adding fuel injector cleaner to the gasoline as the mixture is critical to controlling carbon deposits. Also, if too much cleaner is added, engine damage may result due to the removal of some of the lubricating properties of the oil.

Use Quicksilver 2-Cycle TC-WII or new TC-W3 Outboard Oil which helps control carbon deposits.

#### GASOLINE STORAGE:

Use a major name brand of gasoline from an outlet that sells a large amount of fuel. Fuel stored longer than 15 days may have lost some of the desired properties (dependent on temperature and storage conditions).

Always keep the vent closed on portable fuel tanks when not in use to prevent air exchange and water absorption.

Use Quicksilver Fuel System Treatment and Stabilizer p/n 92-78383A12 and Gasoline Stabilizer p/n 92-817529A12 to prevent unused gasoline from losing desired properties during periods of non-use (15 days or more).

Mercury Marine reserves the right to refuse warranty on parts which are damaged when using improper gasolines and/or lubricants.



THIS NOTICE SUPERSEDES ALL PREVIOUS NOTICES