

## Characteristics of Ethanol-Blended Fuel

Your boat is equipped with a gasoline fuel system. Please take time to read and understand all the fuel related information and warnings regarding gasoline and your boat in the engine owner's manual.

Care should be taken to select fuels having the octane rating recommended for the engine, as indicated in the owner's manual, for proper operation.

### Ethanol-Blended Fuels

Ethanol is an oxygenated hydrocarbon compound that has a high octane rating and therefore is useful in increasing the octane level of unleaded gasoline.

In newer boats, the factory-installed fuel-system components of the engine(s) have been tested to perform with the maximum level of ethanol-blended gasoline (10% ethanol) currently allowed by the EPA in the United States

For older boats, those 10+ years old, special precautions should be considered before using ethanol fuel due to the fact that ethanol can attack some fuel-system components, such as tanks and fuel lines, if they are not made from acceptable ethanol-compatible materials. This can lead to operational problems or safety issues such as clogged filters, leaks or engine damage.

Before introducing gasoline with ethanol into your fuel tank, ask your dealer if any components have been added or replaced that are not recommended by the Manufacturers or may not be ethanol-compatible.

### Filling the Fuel Tank

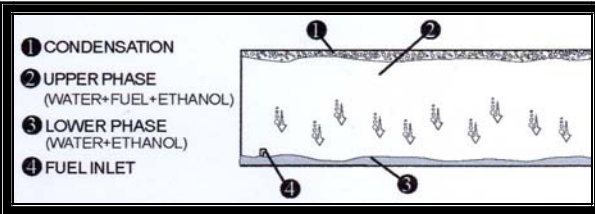
It is best to maintain a full tank of fuel when the engine is not in use. This will reduce air flow in and out of the tank due to changes in temperature as well as limiting exposure of the ethanol in the fuel to humidity and condensation.

### Phase Separation

Humidity and condensation create water in your fuel tank which can adversely affect the ethanol blended fuel. A condition called *phase separation* can occur if water is drawn into the fuel beyond the saturation point. The presence of water in the fuel beyond the saturation level will cause most of the ethanol in the fuel to separate from the bulk fuel and drop to the bottom of the tank, significantly reducing the level of ethanol in the fuel mixture in the upper level. If the lower level, consisting of water and ethanol, is deep enough to reach the fuel inlet it could be pumped directly to the engine(s) and

cause significant problems. Engine problems can also result from the reduced octane rating of the ethanol/fuel mixture left in the upper phase of the tank.

### Example of Phase Separation



### Additives

The only way to prevent phase separation is to keep water from accumulating in the tank. To help accomplish this goal, Nauset Marine recommends the use of a quality additive designed to reduce and/or remove water from the fuel.

If water infiltrates the fuel and phase separation does occur, your only remedy is to drain the fuel, clean and dry the tank and refill with a fresh, dry load of fuel.

### Fuel Filters

Engine manufacturers provide in-line fuel filters designed to protect the engine from debris. However, in most cases, these filters do not adequately remove water from the fuel. The addition of an in-line Fuel/Water Separation Filter to the system will provide greater protection against engine damage.

Additionally, as a precaution, it is advisable to carry extra on-engine filters in case filter clogging debris in the fuel tank becomes a problem during boating.

### Maintenance

Periodically inspect for the presence of water in the fuel tank. If any is found, all water must be removed and the tank completely dried before refilling the tank with any fuel containing ethanol.

### Storage

Long periods of storage and/or non-use, common to boats, create unique problems. When preparing to store a boat for extended periods, of two months or more, it is best to completely remove all fuel from the tank. If it is not possible to remove the fuel, maintaining a full tank of fuel with a fuel stabilizer added to improve fuel stability and corrosion protection is recommended.



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