



## Gasoline Guidelines for STIHL Outdoor Power Equipment

Gasoline plays an important role in everyday life, powering everything from your automobile to your outdoor power equipment. However, all gasoline is not the same. Knowing a few facts about your fuel can keep the engines in your STIHL equipment running strong.

### **What's the difference between my car's engine and engines used in small power equipment?**

Automobiles have comprehensive fuel and engine management systems controlled by electronics and numerous sensors. You may not feel or hear anything going on when your car is running, but there are many measurements and automatic adjustments being made to account for things like humidity, altitude, temperature and the quality of the gasoline being used.

On the other hand, yard and garden power equipment like your STIHL tools are designed to be compact and lightweight. These tools don't have the space available for the equipment found in automobiles and so are much more sensitive to issues like fuel quality.

# Gasoline Guidelines

## Gasoline storage life:

You may not realize it, but gasoline begins to decompose and break down into other compounds in as little as one month when stored. This is not normally an issue for cars since people drive their cars and refill their tanks on a regular basis.

Outdoor power equipment is often used far less frequently, sometimes as little as a few times in a year, and then can be stored away for weeks, months or years until it is needed again. And additional fuel is normally stored in containers that may only be refilled once or twice a year. This means there is a greater chance of the fuel breaking down and forming gum and varnish-like compounds that can easily restrict or block the tiny fuel passageways used in small engines.

Any gasoline remaining in your storage can or left in your power equipment for more than 2-3 months can lead to expensive damage to your equipment's fuel system and engine. This is why STIHL recommends always using fresh fuel or specially formulated fuel mixes like STIHL MotoMix® in your equipment. STIHL MotoMix® is a high-grade, high-octane, ethanol-free premixed fuel containing STIHL HP Ultra synthetic oil. It is a pure and stable fuel mixture that can be stored for up to two years in the original container and is ideal for machines that are used infrequently.

## What you need to know about Ethanol:

Ethanol gasoline blends have different characteristics that need to be considered when fueling your STIHL power equipment.

- Much of the gasoline sold throughout the United States contains ethanol. The maximum ethanol content allowed by law for use in outdoor power equipment is limited to 10% (E10). Most small power equipment engines are designed to use no more than a 10% ethanol gasoline blend.

If you are not sure of the ethanol content in the gasoline you are purchasing, ask the station attendant. If they are unsure, purchase your fuel from another station that offers gasoline with no more than 10% ethanol.

- Ethanol is a stronger solvent than gasoline and can soften, swell and damage some rubber and plastic components that gasoline alone would not harm.

The solvent properties of ethanol can also dissolve varnish and gum deposits that have previously formed inside fuel storage cans, fuel tanks or the equipment's fuel system. When these deposits become dislodged, they can mix with the fuel and plug small openings and filters within the fuel system and cause costly damage to your equipment.



**Varnish in Carburetor**



**Carburetor damage from stale fuel**



**Damage to carburetor diaphragm**



Left: **Plugged fuel filter screen**  
Right: **Clean fuel filter screen**

# Gasoline Guidelines

- Ethanol easily attracts and mixes with water, so any moisture in the air can be absorbed by the ethanol gasoline blend. This moisture can corrode metal components in the fuel system leading to expensive repairs.

If enough water is absorbed, the ethanol and water will settle out of the gasoline blend. The resulting ethanol and water mixture is heavier than the gasoline and settles to the bottom of the equipment's tank or your storage can, leaving a layer of gasoline floating on top.

With the ethanol separated from the gasoline, the layer of gasoline now has a lower octane level than the original ethanol gasoline blend. If you originally bought 87 or 89 octane fuel, the gasoline layer in your storage container now has a lower octane than what the engine manufacturer intended to be used, resulting in unstable engine operation, power loss and major engine failures.

This separation of ethanol and gasoline can also occur inside the fuel tank of your equipment. Since the fuel is often drawn from the bottom of the fuel tank, the engine is drawing in a mixture of ethanol and water with no gasoline and, in the case of 2-cycle engines, also has no lubricating oil. This ethanol/water mix is thicker than gasoline and cannot easily pass through the fuel system. This can result in hard starting, unsafe high idle speeds, stalling and can ultimately lead to engine damage or fuel system failure, resulting in costly repairs.

## Guidelines for using E10 gasoline in STIHL power equipment:

U.S. EPA regulations make it illegal to use gasoline containing higher than 10% ethanol content in outdoor power equipment like your STIHL power equipment and doing so can void your STIHL Limited Warranty.

If the proper precautions are taken, however, gasoline containing a 10% quantity of ethanol can safely be used in your STIHL products.

- Use a minimum of 89 octane gasoline and always use fresh fuel. Only buy enough gasoline that you can easily use up within a two-month period.
- For air-cooled, two-cycle engines, use a quality mix oil that meets the engine manufacturer's recommendations. All STIHL oils are designed to readily mix with gasoline containing 10% ethanol. STIHL HP Ultra Oil is especially suited for use with E10 gasoline.
- Shake your gas can well when first mixing the oil to thoroughly disperse the oil in the fuel mixture.



**Corrosion inside carburetor**



**Water and ethanol (bottom layer) separated from gasoline (top layer)**



**Corrosion from water inside carburetor**



# Gasoline Guidelines

- Gasoline containing ethanol has a tendency to “lean out” the carburetor mixture when compared to gasoline without ethanol. Make sure your Dealer is aware that you are using gasoline with ethanol in it so that he can ensure the carburetor is adjusted properly for the fuel that is being used.
- Properly store your equipment. If your equipment is not going to be used for a couple of months, the remaining gasoline in the machine should be drained from the tank and disposed of properly. To ensure that any remaining ethanol is removed from your equipment, STIHL recommends adding a small amount of STIHL MotoMix® premixed fuel to the tank and running the engine for a few minutes to circulate the fuel through the carburetor. This will flush any of the original gasoline out of the system and protect the fuel system components from water absorption and fuel decomposition. If the machine is going to be stored for several months, it is good practice to empty the STIHL MotoMix® from the machine’s tank, then start the engine and run at idle (do not rev up the engine) until the machine runs out of fuel.
- Equipment should be serviced regularly by your STIHL Dealer. Items such as fuel filters, fuel lines, carburetor diaphragms and spark plugs should be checked and replaced if necessary, as part of a normal engine tune-up.

By following these guidelines and suggestions, your STIHL equipment should perform the way it was designed and help you get the job done. For more information and tips to help you get the most out of your STIHL, visit [STIHLusa.com](http://STIHLusa.com).



**Seized piston**



**Use STIHL MotoMix®**