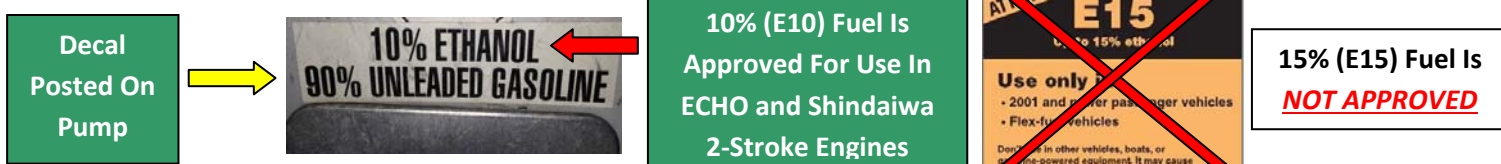




## Protect Your Equipment From Costly Engine & Carburetor Repairs Use The Correct Fuel!



Only use Fuels that contain 10% Ethanol blend or less in ECHO and Shindaiwa 2-Stroke Engines. Look on your gas stations pump for a sign or decal to identify the percentage of Ethanol in the gasoline. In most states in the U.S. this is required by law.



Use of fuel containing **over** 10% Ethanol (E10), such as (E15, E20, E30, E50 and E85), or any fuels not meeting ECHO and Shindaiwa requirements, are not approved for use in ECHO and Shindaiwa gasoline engines.

**DAMAGE CAUSED TO ECHO & SHINDAIWA ENGINES AND FUEL SYSTEM COMPONENTS BY USING FUELS CONTAINING **OVER** 10% Ethanol (E10), WILL NOT BE COVERED UNDER WARRANTY**

**Use Of Fuels Containing **over** 10% (E10) Ethanol can cause the following problems:**

Poor engine performance, loss of power, overheating, fuel vapor lock, improper clutch engagement caused by increased engine idle speeds allowing cutting attachments to turn while unit is idling, premature deterioration of fuel lines, gaskets, carburetors and other engine components.



To get the most out of your ECHO and SHINDAIWA products use ECHO PowerFuel. ECHO PowerFuel is a pre-mixed fuel, containing 93 octane gas, with **no ethanol** and is specially mixed with ECHO Red Armor Oil™ at a 50:1 ratio. ECHO PowerFuel is recommended for use in all air-cooled, 2-stroke engines. With ECHO PowerFuel you never have to worry about problems with ethanol blended fuel or stale fuel problems as it stays stable and usable for up to 2 years after opening.

For more information, about Ethanol Blended Fuel use and fuel requirements please visit <http://www.echo-usa.com/Warranty/Learn-About-Ethanol>

## Power Equipment Ethanol Problems

ECHO handheld power equipment is designed to tolerate up to 10% ethanol blended fuel and cannot compensate for higher concentrations of ethanol like your car. Hand held power equipment is not used as often, so fuel is often stored much longer than two weeks. Therefore, engine and carburetor problems can still occur when running your equipment on the approved 10% or less ethanol content depending on how your fuel is stored and when the fuel that you are using becomes older than 30 days.

**WATER** – Ethanol in blended fuel attracts moisture as soon as it's exposed to air. High humidity and fuel cans with poor sealing or missing spout covers or vents accelerate the problem.

**Missing Spout & Vent Cover**



**No Spill Fuel Can With Self Sealing Spout Recommended**

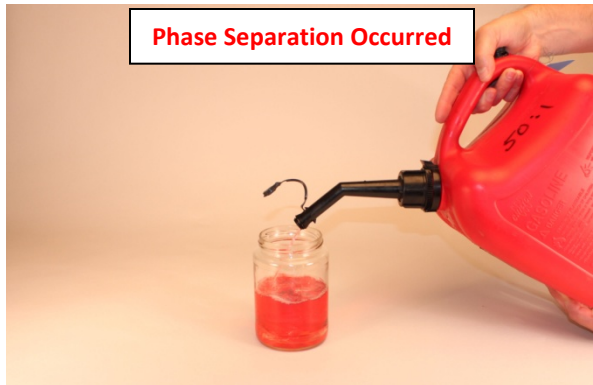


**No Vent To Allow Air To Enter**

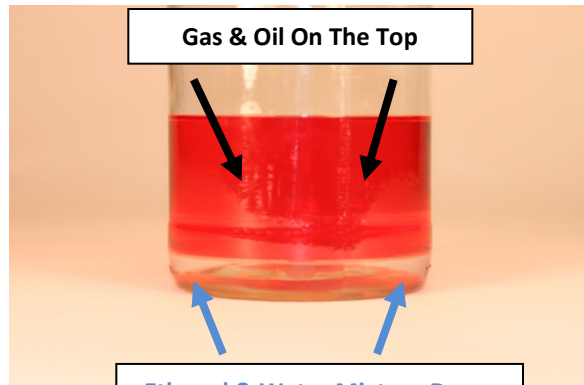
Ethanol will absorb a small amount of moisture and stay in suspension within the gasoline for awhile. However, the ethanol will only absorb up to  $\frac{3}{4}$  of an ounce of water in a gallon of gas before it reaches its saturation point.

Once the ethanol has absorbed enough moisture to reach its saturation point, phase separation occurs. Phase separation means the ethanol and absorbed water drop to the bottom of the fuel container because it is heavier than the gas and oil. Floating on top now is the gasoline and oil mixture. Most operators never notice water in the can when they refuel their equipment. The end result is most often ruined carburetors with rust and corrosion. These expensive repairs can cost over \$75.00 and are not typically covered by warranty.

**Phase Separation Occurred**

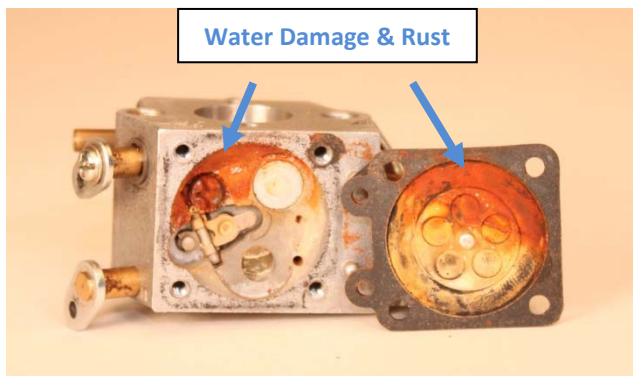


**Gas & Oil On The Top**

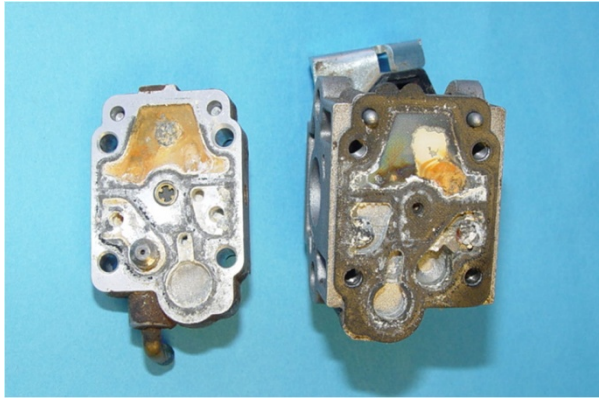


**Ethanol & Water Mixture Drops To The Bottom Of Tank**

**Water Damage & Rust**



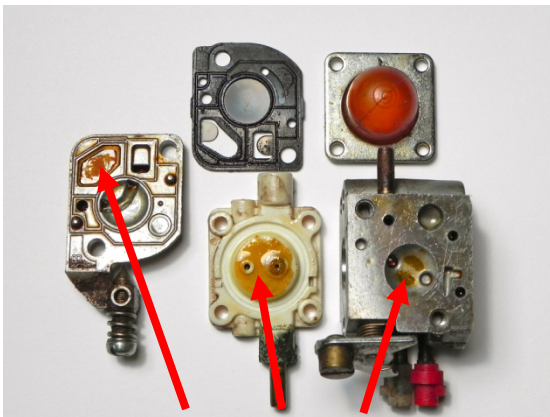
Remember, as the ethanol and water drop to the bottom of the fuel container, the 2-Stroke oil stays mixed with the gasoline on top. If engines are run on the ethanol water mixture, serious engine failures may occur. Most often these non-warranty failures mean replacement of the carburetor, engine or complete unit.



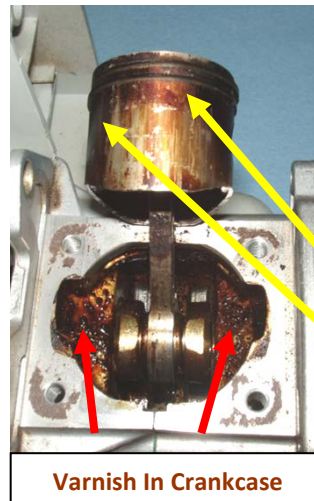
## Power Equipment Ethanol Problems (Con't)

**STALE FUEL** – Gasoline begins the gradual process of degrading and losing its volatility as soon as it leaves the refinery. Just like milk, bread and other food items, gasoline will eventually spoil or turn stale. You'll probably get sick if you drink spoiled milk. Leaving stale fuel in an engine will typically first cause non-warrantable fuel system damage. Stale fuel is the number one cause of stiff carburetor metering diaphragms and a leading cause of

carburetor replacement. Very often, engines will run on stale fuel for some time. Stale fuel gum & varnish will quickly stick the piston rings of a running engine causing its failure. Stale fuel is nothing new. We have had this problem long before there was any ethanol blended fuel. The difference is that today's fuel can start to turn bad much sooner than in the past. In fact, today's fuel can begin to turn stale in as little as 30-days. High temperatures, high humidity and poor fuel storage are all factors in fuel turning stale prematurely. However, the major factor in today's fuel short shelf life is ethanol. Ethanol absorbs moisture which is a factor in the formation of stale fuel. In addition, ethanol adds more oxygen to the fuel, speeding up the oxidation (stale fuel) process.



Varnished Carburetor



Varnish In Crankcase



Piston Ring Stuck  
Varnish On Piston Skirt

## Preventing Ethanol Blended Fuel Problems

1. **PURCHASE ONLY RECOMMENDED FUEL** – All ECHO products are designed to run on gasoline blended with no more than 10% ethanol (E10). Do not run your ECHO equipment on E15, E20 and especially not E85. These fuels can result in: poor engine performance, low power, overheating, vapor lock, improper clutch engagement, premature deterioration of fuel lines, premature deterioration of fuel cap gaskets and premature deterioration of carburetors. Using unauthorized fuel in ECHO two-stroke powered products will void your engine warranty.
2. **USE PROPER FUEL CONTAINERS** – Never store fuel in containers with open or leaking spouts. Replace old fuel containers with separate vents. Leaking open fuel containers are a fire safety hazard that promote the absorption of moisture and cause fuel to turn stale quicker. Use only modern self venting fuel containers with “no spill” self sealing spouts.
3. **SHAKE THE FUEL CONTAINER** – Shake the fuel container for 30 seconds just prior to filling your equipment. This practice ensures the fuel is mixed properly and helps to suspend any small amounts of moisture in the mixture.



4. **STORE FUEL IN A COOL DRY AREA** – Cool controlled temperatures extend fuel life as it slows the aging process. Keeping the can in a dry area will also reduce the formation of condensation inside the fuel container. Caution: Fuel should never be stored in your house or by a flame or ignition source.
5. **PURCHASE ONLY ENOUGH FUEL FOR 30-DAYS OF USE** – This is one of the best ways to prevent using stale fuel. Only purchase fuel from name brand high volume stations to ensure you get the freshest fuel possible.
6. **USE ECHO PowerBlend X™ or Red Armor 2-STROKE OIL** – These oils contain a small quantity of fuel stabilizer to extend the life of the gasoline mixture.
7. **ADD A NAME BRAND FUEL STABILIZER FOR STORAGE UP TO 90-DAYS** – The fuel stabilizers are effective only if they are mixed with fresh fuel (just bought at the pump) and proper fuel storage remains just as important. Remember nothing will properly rejuvenate old, stale fuel!
8. **DRAIN FUEL COMPLETELY FOR STORAGE** - If you do not intend to use your ECHO product within a 30 day period, drain the fuel completely from the carburetor and the fuel tank.

We hope that this information helps you understand the importance of proper ethanol fuel storage, helps prevent potential product issues, avoids costly & unnecessary repair bills and enables you to enjoy your ECHO product when you need it.

For additional information concerning fuel and oil please visit our website at <http://www.echo-usa.com/Support-Help/FAQs>