

CARBURETORS & ALTERNATIVE FUELS

Recently there has been lots of discussion in the classic car hobby about fuel. There are a lot of myths associated with alternative fuels and we will attempt to clear up any misconceptions. Let us begin by defining the various types of fuel available in today's market.

Gasoline - is available in multiple grades, octane ratings and either leaded (racing fuel) or unleaded.

Gas/Ethanol Mixture (gasohol)—All major vehicle manufacturers have approved the use of gasoline containing ethanol up to 10%. At these levels of ethanol, no modifications are required to the vehicles.

E85—This is a relatively new product that contains 85% ethanol and 15% gasoline. This product is only used in specifically designed or Flexible Fuel Vehicles (FFV).

DIFFERENCES BETWEEN GASOLINE AND ETHANOL

To understand the differences between gasoline and ethanol (alcohol), we need to talk about stoichiometric ratios. By definition, stoichiometric ratio is air/fuel ratio that is the best blend of reasonable power and economy. In the real world, this means for every one pound of gasoline burned you would need 14.7 pounds of air to achieve this. By contrast, again by definition, the richer full power air/fuel ratio equals 12.5 pounds of air to one pound of gasoline. This full power ratio with the same amount of air will produce almost 20% more hp than the 14.7:1 air/fuel ratio. This leaner 14.7:1 ratio is what you want entering the engine when cruising the highway at 70mph. If you need to climb a hill or pass, you'd want the carburetor (or fuel injection) to change that ratio to 12.5:1 (which is what your power valve does). This provides the burst of power required in these situations.

Now that we understand the fancy term stoichiometric ratio, the ratio for ethanol/alcohol is 6 pounds of air to one pound of ethanol. In plain English, that means that you need twice the amount of ethanol that you do gasoline to achieve stoichiometric ratio. With roughly twice the amount of fluid required to flow through a carburetor before the fluid is mixed with the air, it is easy for many to understand why a gasoline carburetor cannot efficiently be used for high percentage alcohol fuels. If you have ever looked at any of the racing parts websites, you will see that there are a number of alcohol carburetors available. The major difference is that the fuel passages (not just the jets) are much larger. An example would be approximately 1/8" to over 3/16-inch.

EFFECTS OF ETHANOL MIXTURES ON CARBURETOR COMPONENTS

Brass Floats – Pony Carburetors replaces every brass float with a solid black nitrophyl float that we possibly can. Brass floats are soldered together. Over the years, with constant heating and cooling, the resulting expansion and contraction, the solder seams are going to separate, create a leak and the float will sink just like the Titanic. This causes gasoline overflow all over your engine. At Pony Carburetors, we call this "Old Faithful" due to its resemblance to the geyser in Yellowstone National Park.

Nitrophyl Floats—Nitrophyl is a closed cell material. It is impervious to virtually all petro chemicals. Only Rochester Quadrajets with a different brown nitrophyl, not black, have ever had a history of failing (getting heavy).

*1965 and older Autolite 2100 and 4100 carburetors had brass floats from the factory. In 1966 and subsequent years all floats were nitrophyl. All Autolite/Motorcraft 4300/4300D carburetors had nitrophyl floats.

In more than 22 years of carburetor work, we have only seen two bad nitrophyl floats in Autolite 2100/4100 carbs. We have had to replace some Autolite 4300 floats because there were some aftermarket ones that were made with slightly wrong dimensions. This causes the float to rub and bind on the main body. We have also seen the float come loose its metal support a few times, but have NEVER seen one get heavy. In the Holley 4150/4160 carburetors, except LeMans bowl carbs, we replace all hollow brass floats with nitrophyl. There are some older model carburetors that we are forced to use brass floats due to no replacements being available. The reason that we replace all these floats is to eliminate float failure in our restorations. The bottom line is that in all the years of dealing with carburetors, we have found that Ethanol does not effect the floats!

Accelerator Pump Diaphragms and Power Valves – Over the years we have had less than a handful of incidences regarding stiffening of diaphragms in accelerator pumps or power valves. It is certainly not traceable to Ethanol on these isolated issues. We believe some other additive contributed to the part failure. Today, we use the same components (the best money can buy) as we did over 20 years ago.

Accelerator Pump Cups – Alcohol will destroy Buna N rubber accelerator pump cups in 2-6 months. The cups turn very stiff and brittle. Buna N rubber cups are easily identified as being black in color. There is a newer material called fluorelastomer and is blue in color. This material appears to be unaffected by any gasoline additives including ethanol. Accelerator pump cups are found in Autolite 4300's, Holley 4000 Teapots, Rochester 2G, 4G, and Quadrajets.

THE TRUTH ABOUT GASOLINE ADDITIVES

Buying off-the-shelf lead substitutes and octane boosters is a total waste of money. For instance, take a look at the first ingredient in many of these items. It is normally Ethanol. So a person pays \$4.00 for a half pint can, when the alcohol costs the manufacturer a couple of dollars a gallon. Tetra-ethyl lead is not required for any vintage engine unless you are beating the car down the interstate day after day, hour after hour. The supposed valve lubrication is just not required in occasional use vehicles. However, if you feel that your application requires the lead additive, get the real tetra-ethyl lead off the internet.

I am sure that some of our readers will find this article controversial and contrary to other information printed in hobbyist magazines. The purpose of this article is to share our real world experiences over the last 22 years in the carburetor business. We hope that you have found this information useful and entertaining. If you have comments or questions relating to this or any other Good Carbs articles, feel free to email us at sales@ponycarburetors.com. For more info on E85 and ethanol, please visit www.e85fuel.com for the National Ethanol Vehicle Coalition.

Jon M. Enyeart

JON ENYEART

Contributor &
President of Pony Carburetors

Email: sales@ponycarburetors.com
Phone: 866.662.3003 (Toll Free)

