

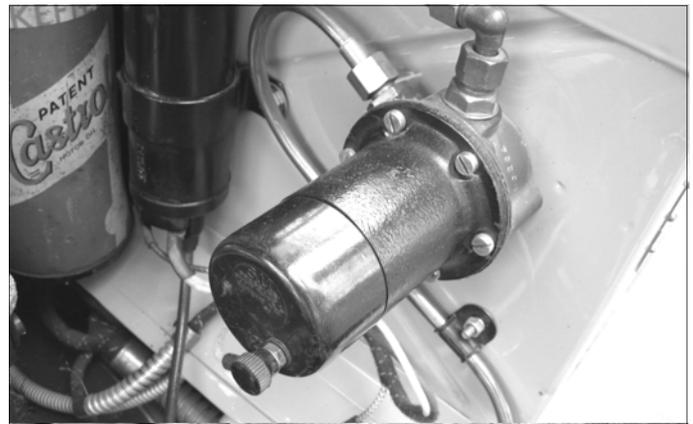
Fuel For Thought

The July 2007 issue of the British Magazine *Enjoying MG* included an article by Roger Parker called "Petrol for the Classic MG". Roger cites a number of design changes on modern cars that have required modifications to fuel and concludes that, "This has produced a widening gulf between the classic engine design and the fuels available, leading to a number of running problems". Roger's observations reflect mine in the book *MGB Electrical Systems*, in which, because of the difference in modern gasoline characteristics compared to those for which the car was designed, I recommend using 'book' distributor timing data only as a starting point. Proper setting of the ignition can now only be done, I contend, by using premium fuel and test driving to establish the point where knock occurs, and then retarding the timing only just enough to eliminate it.

Care has to be taken not to fully transfer statements about British fuels over to those sold in North America, factors such as emission standards, vehicle type, climate and even taxation affecting gasoline formulation. However, recent experiences lead me to believe that our fuel, like that Roger describes as being sold in Britain, is becoming more volatile and contains more agents that tend to gum and eventually solidify after it has more quickly evaporated. I first noticed this last spring when my normally easy-to-start lawn mower just refused to fire up. Looking in the carburetor reservoir I found the float glued to the chamber and the fuel needle firmly stuck in the upward position, preventing fuel entry. Amazingly, the fuel residue that forms this glue doesn't readily dissolve in the gasoline in which it was borne but it does seem to succumb carburetor cleaner.

In a few weeks, when I get the lawn mower ready for winter storage, I'll remember to switch the fuel tap off and then run the engine until it stops, that is until all the fuel in the carb has been exhausted. I'll do a similar thing with the MGs too. I'll disconnect the fuel pumps and again run the engines until all the fuel in the carburetors is used up. Discussing the lawn mower problem with fellow club member Andrew Turner, he tells me that he adds stabilizer to his lawn mower fuel, and that precaution has proved a great problem preventative for him. I'll follow his advice in both my mower and my MGs, but I'll still make sure the carbs are empty. I can see that stabilizer may stop the gas going 'sour' but those gummy additives are still going to be in it and left behind after the fuel evaporates.

I mentioned earlier that only premium fuel should be used in an MGB. That's because MGs as well as Midgets made after the Mk 1, were designed for 97 or



Disconnecting the electrical connections to a fuel pump is easier on some cars than others.

Top: The TC's is under the bonnet,
Middle: The early MGB's pokes into the battery well,
Bottom: On late MGBs the pump is partly in the boot.

98 RON. Note that "RON", which means Research Octane Number, is one method of rating the octane or anti-knock capability of a fuel. There are several other ways in which octane can be measured but the most common alternative system is the MON or "Motor Octane Number". MON yields a number 8 to 10 points below that of the RON method and because both systems were at one time simultaneously used in North America, sometimes for purposeful deception, regulatory authorities decided that the system here



would be standardized as an average of the two measurement methods. Next time you are bored standing by the gas-station pump, look for the notice declaring that the octane rating is $(R + M)/2$. The result is that North American octane ratings are 4 to 5 points lower than those declared in Europe so about 93 octane fuel should be used in MGBs and most Midgets. Earlier cars designed for 91 RON fuel can get away with the 87 octane sold here. Failure to use a high enough octane fuel can cause running-on (dieseling) after the ignition is switched off and pinging, a tinkling noise, caused by pre-ignition when the engine is under stress. Both phenomena can be very damaging, perhaps burning a hole in a piston. Note, however, that using too high an octane fuel only burns a hole in your pocket! Late MGBs had a decompression valve to thwart running-on, not even the highest octane fuel available always preventing it. If you have a running-on problem, try using an octane booster. At the very least stop the engine as soon as possible after key-off by stalling the car in gear.

Of course all our MGs were designed for leaded fuel. Unless your car has had the cylinder head modified to be a 'leaded head' by having hardened valve seats installed, then you should remember to use a lead substitute additive with each fill-up. Various brands of lead substitute claim that their particular alchemy is best but virtually all the products sold in the US, such as *Bardahl Insted O'Led* and *CD-2 Lead Substitute*, are based on sodium, the EPA expressing concerns about the active ingredients found elsewhere. In other countries, including perhaps Canada, other primary agents such as phosphorous or potassium can be found. All work by depositing a soft cushion of material in the valve seats to protect it from heat and mechanical stress in much the same way lead used to. Tests published in the British

magazine *Classic & Sports Car*, June 1999 on lead substitutes found that manganese, a product found in some octane boosters, was as effective as any lead substitute in reducing valve seat recession (VSR). In the USA, Bardahl Octane Booster and CD Octane Booster are both based on manganese, but neither company makes any specific claims regarding their booster's efficacy in reducing VSR.

A further problem arising from modern gasoline formulation – and due to its greater volatility – is vapor lock. Gary Odor's Midget kept misbehaving on the hot drive back from Mad Dogs this year and, although it could not be proven, the consensus of the assembled WDMGC brains there was that the cause was vapor lock. Vapor lock occurs when the gasoline gets so hot as it nears the carburetor that it changes from liquid to vapor and won't pump. Gary's 1975 Midget had (he's now sold the car) a mechanical fuel pump that, for most of the fuel pipe length, sucks the fuel up and this type pump finds it very hard to move vapor. MGBs and earlier Midgets with electric pumps at the rear of the car that push the fuel through are much less susceptible to the problem. Our MGs do not have cross-flow cylinder heads and that means that the inlet and exhaust are on the same side of the engine. The hot exhaust heats the incoming fuel and, unless precautions are taken, can cause fuel vaporization. Those precautions are usually careful fuel pipe routing and a heat shield for thermal: blocking, reflecting and insulating, reducing: convected, radiated and conducted heat. Unfortunately, most heat shields in our cars have lost their insulation, seen as a white mat on the under-surface, and are no longer shiny and so are much less effective than they should be. Vapor lock can often be recognized because it usually occurs when the car slows down after having been driven hard. The hot engine and lower air-flow cause the under-bonnet temperature to rise rapidly while at the same time the fuel moves less quickly in the supply pipe and has more time to rise above its vaporization temperature.

Another problem I have seen this year, this time on an MGB fitted with HIF carburetors, is engine misfire due, apparently, to the mixture being very lean when the car is driven hard in hot conditions. I wonder if in this case too, modern fuel characteristics are the cause. The HIFs rely on a bimetal beam (a device that bends in proportion to the temperature it sees) to weaken the fuel/air mixture as the temperature increases. Could it be that a device designed to compensate for 1970's fuel mixtures just won't work properly with those available today?

Next time your MG hiccoughs or burps, instead of blaming Lucas or MG maybe you should think of it as a baby, and simply blame it on gas.

More ↓

Ethanol Issues

By Rick Astley

We've discussed the effects of ethanol on our classic cars in these pages before, but since so many of us will be putting our cars in storage this month, I thought it worth researching some of the history and new data again.

Ethanol has so concerned insurance companies that specialize in classic cars, that many have introduced clauses specifically excluding any engine damage that may arise from its use. To its credit, Hagerty, the major such insurer in Michigan, decided to study the problem in conjunction with Kettering University Advanced Engine Research Laboratory. It was following the publication of the results in 2009, that we summarized them in *The Can-Am Connection*. You can find the full results on Hagerty's web site.

The problem is a worldwide one. Prompted by concern expressed by its readers, the British magazine *Enjoying MG*, last month published an article, authored by its esteemed correspondent Roger Parker, about the gradual introduction of E5 there. (The number indicates the percentage of ethanol in the fuel so E5 = 5% ethanol). In Canada, E5 is mandated and in some states of the USA (FL, HI, IA, KS, LA, MS, MO, OR & WA) E10 is mandated. There is as yet no mandatory ethanol content specified in Michigan but, according to the Department of Agriculture and Rural Development, nearly 50% of the fuel currently sold in the state is E10. It's very hard to find any ethanol-free gasoline in Michigan partly because there are at least 4 operating ethanol plants in the state, and it will become harder when the 6 others, either being constructed, planned or proposed, come on-line. You will find a few, (check with <http://pure-gas.org>) but you find that most of them are at boating marinas.

There's a lot of politics in the reasons why ethanol is being introduced into automotive fuels, which we won't debate here. Proponents include those who promote clean air and less independence on foreign energy sources. Opponents claim that decisions were made as a result of heavy lobbying from the agricultural industry, that prices of corn based food are increasing, that ethanol is dangerous to transport and that the electrical energy from coal-fired power stations required to turn corn into ethanol, negates clean-air claims. Research and make your own decisions on those points, but it can be said that your classic car will be adversely affected by ethanol in its fuel and it would be prudent to try to minimize any problems.

The consensus from Hagerty, *Enjoying MG* and other sources is that ethanol will corrode or otherwise damage metals including steel, zinc, brass, copper and lead-tin solder. It will also damage and dissolve rubber, neoprene, varnish (previously used to protect fuel tanks from corrosion) and cork.

Ethanol also leaves a sludge in the form of gum, which Hagerty described as being "minor" but that I have found to be quite problematic. Ethanol is very volatile and I suspect that, while Hagerty's tests were continuous, in engines that are allowed to sit idle for a few days or more between use (as are my MGs' and lawnmower's) the fuel in the carburetor evaporates after each use and leaves a gum-like residue that builds up over time. I've found that the gum hardens over winter into a varnish that will stick a carburetor float to the bottom of its chamber and which is hard to remove, even with carburetor cleaner. It does eventually dissolve as new fuel enters, but in doing so peels off in particles that can block carburetor jets.

The very volatile nature of ethanol has been associated with the problem of fuel boiling in carburetors and the occurrence of vapor locks in fuel lines, so keep this in mind should either of these problems seem to spontaneously occur.

Avoiding, or at least minimizing, potential problems from ethanol, particularly during over-wintering, include the following measures:

- Filling the fuel tank so as to expose as little as possible of the tank's ethanol-washed walls to air.
- Adding a fuel stabilizer and driving around the block to mix it in and start it moving throughout the fuel system.
- Once the car is in its winter storage position, emptying the float chambers. You can physically remove and drain them or disconnect the fuel pump and run the car until it stops. Disconnection is easy on T cars which have a very accessible under-bonnet pump (1). On MGAs, Midgets and chrome bumper MGBs, access to the pump is somewhat harder, usually requiring a crawl under the car to pull-off the ground (2) or removal of the battery to disconnect the power wire (3). Rubber bumper MGBs have a more accessible pump located behind a protection plate at the forward/right side of the boot (4) but, if it's a full North American specification vehicle, you should find an inertia switch, in the form of a long cylinder located just above your left knee. Pull on the button (5) located on the bottom to

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switch-off power to the pump. In all cases, reconnect the pump immediately after the engine stops, otherwise you are sure to forget what you did 4 or 5 months earlier! Sorry, 1500cc Midget owners, your mechanical fuel pump is rather harder to disable.

- Making “minor updates,” as Hagerty calls them, including changing seals, fuel lines and gaskets for new ones made from more modern materials, but, like me, you may not agree here with the use of the word “minor.”
- Using a transparent-bodied fuel filter. This will prevent sludge, rust and dissolved material from upstream of the carburetor from entering it, and will let you easily see if you have a potential problem from a lot of debris in the fuel.
- Making sure that any heat baffle under the carburetor(s), which is intended to provide insulation from exhaust manifold heat, is in good condition. If the carburetor is heard to be “percolating” after switch-off, consider switching to a thicker gasket.

I hope this article helps members make the best of a situation we can't control. However, I am no expert on this subject and learned most of the above from Internet research, so its veracity is necessarily suspect. I'd welcome and publish feedback, advice and corrections from any member who has something to contribute. You can find my contact details on page 2.