

### Diagnosing a Fuel Related Problem

Engine running problems (warmed up and off idle) related to fuel will usually give the driver the sensation of no power, reduced power, hesitation, flat spots, or surging. This would be opposed to electrical and mechanical problems that cause individual misses (putt, putt, putt) or harsher bucking or jerking under a load.

Fuel problems can generally be divided in to two categories: Fuel Delivery and Fuel Management. The following may help with diagnosis of cars & FC with the two carburetor system – some checks can obviously be used on turbos:

**Fuel Delivery Problems:** The quickest diagnostic tool is to remove a fuel line from a carburetor, push a short rubber fuel hose on to the line and insert it into a container. Crank the engine (coil wire out of the cap and securely grounded) and watch the delivery rate. The book calls for 1 pint in 30 seconds, but if there is a problem you will quickly see only a dribble or a rapid reduction in flow after five seconds. **If delivery is a problem and you have a stock fuel pump**, next remove the inlet line from the fuel pump while leaving the carburetor line still open (necessary for the pump to work) and carefully put your finger over the inlet fitting. Crank the engine and see if the pump sucks your finger in. If it does not, then the pump or the push rod or the eccentric is the problem. If it does suck your finger in, then the problem is in the line from the tank; a plugged pickup, line problem, or no gas in the tank (bad gauge).

**Inlet Line Problems:** The inability of the pump to draw gas from the tank usually shows up on a long pull in high gear – maximum fuel use and minimum pump action. However, any hole in the inlet line will not allow vacuum to build up and that problem would be evident during cranking, since higher pump speed would create vacuum quicker. Check both original rubber hoses (above starter and at the tank outlet). Gas lines can rust through under the vehicles from dirt and moisture. There is a filter in the gas tank attached to the sending unit. Check it by carefully removing the tank outlet rubber hose over a pan and watch the flow; if the pickup filter is plugged, the flow will drop off or even stop very quickly. A continuous steady flow indicates the filter is good (or missing). Check your gas cap also, **it must be vented**; a non-vented cap will form a vacuum in the tank and prevent flow into the line. A non-vented cap could also allow pressure to build up from cold fuel being warmed.

Remember that the fuel delivery system works by creating vacuum in the inlet line which causes atmospheric pressure in the tank to force fuel to the carburetors. When you are trying to start a car that has no gas in the carburetors, you must allow the pump to create vacuum by continuous cranking. If you crank for five seconds, let off the key and pump the pedal, you allow the vacuum to bleed off and the pump has to start over. A Corvair starter can crank up to 30 seconds continuous before overheating. Usually 10 seconds of cranking will bring fuel, even in an FC, but it must be continuous. A shot of Gummout in each carburetor throat will help but avoid starting fluid – it is hard on top rings and valve seats.

**Fuel Management Problems:** If you are confident you have good delivery and yet running problems persist that are definitely related to the carburetors, you have two choices. One is to try to pinpoint and fix a specific problem or the second is to do a carburetor overhaul and do all the neat things such as re-jetting for ethanol, matching venturi cluster feed holes, adding throttle shaft seals, sealing base gaskets and making all the correct adjustments. If you do not know the history of your carburetors, the comprehensive overhaul is the route to take. Who knows what others before you have done; miss-matched carburetors and missing parts are common, and make diagnosis difficult.

**Diagnosis can be divided into two directions:** a lean running problem or a rich running problem.

- Rich conditions usually show up as black exhaust smoke, either at idle or under acceleration, and possibly flooding on startup, or a very low idle leading to a dead engine. Shut off the engine and quickly look down the carburetor throats. If you see continued dripping gas off of the venturi cluster then you have a bowl that is too full: check for a sunken float, loose needle seat or the incorrect float adjustment. If you have a late model with power valves in the carburetor, a very rich condition under acceleration will occur if the valve is stuck open or missing.
- Lean conditions can occur for a number of reasons. A good test is to use Gummout as an enrichment agent. Gently mist the cleaner over each carburetor at idle and see if the idle increases; if it does, you have a vacuum leak or a carburetor idle circuit problem. Use the same test for under load conditions. Have an assistant hold the brake and load the engine in gear (automatic or clutch) while you apply the Gummout. If the engine picks up, whichever carburetor responds needs attention.

The most common lean conditions are: enlarged PCV orifice ('64 & later) or the wrong PCV valve which becomes just a big leak, leaking rubber hoses at the PCV system, leaking hoses on the crossover tube, leaking carburetor base gaskets, leaking hoses on Powerglide modulator lines, ruptured choke pull-offs, and 140 secondary carburetors with throttle valves that do not close completely. Misting Gummout around vacuum connections can be helpful. One other issue that can mimic carburetor problems is valve adjustment – too tight will cause idle problems; spitting back through the carburetors and actual misses at cold startup.