

Fuel Quality Test Kit

Once in a while, a car can make you simply throw up your hands in total disgust. You've checked everything. Fuel pressure is good and injectors are spraying as they should. The ignition system is up to snuff and all adjustments are right on the money. Compression and valve timing are correct. You've checked available voltages and grounds, the charging system, and the customer's horoscope.

So how come you still have this car that insists on hard starting when hot, bumps and chugs at idle, and simply refuses to run as it should? You've checked everything. Right?

But have you checked to find out what might be hiding in the gas tank posing as fuel? If cars ran on water, OPEC would close its doors in the morning.



To check for water, coat the metal tip in the wand with paste, draw it into the plastic sheath. Then insert it through the filler neck until the tip reaches the lowest part of the tank. Withdraw the wand and inspect the paste on the metal tip. Water will make the paste change color—from green to red.

Miller Special Tools has a kit available that allows you to make some very important tests to find out if the car is burning good gas or some contaminated chemical catastrophe.

This kit allows us to check for the following:

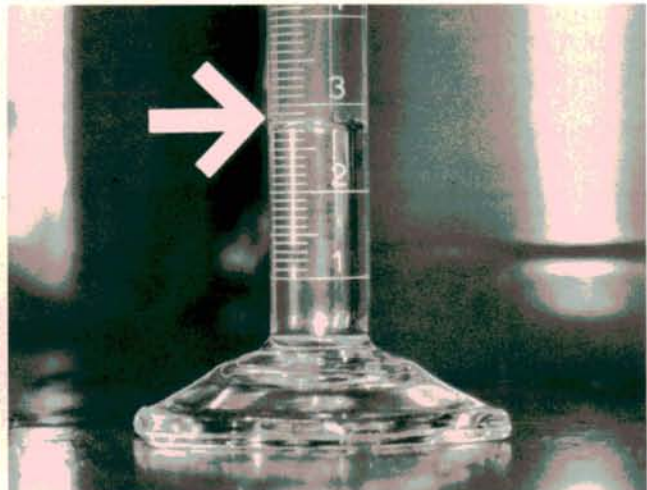
- Water in the gas tank.
- The presence of excessive amounts of ethanol or methanol in the gas.
- The rate at which the fuel will vaporize (Reid vapor pressure).
- The presence of lead in the fuel.

Even if everything else is working properly, a positive test for only one of these conditions can point you to your problem. If you find more than one, you're in the bonus round. Some shops start with this test, instead of using it as a last resort, especially if the type of vehicle they service and local fuel and climate conditions tell them that they're likely to run into this type of problem.

The kit includes:

- A long wand and a jar of water-sensitive paste to check for water.
- A graduated cylinder for checking ethanol/methanol content.
- A fuel cup with pressure gauge and thermometer for checking Reid vapor pressure.
- A box of litmus paper for checking lead content of exhaust deposits at the tailpipe.
- When you get your kit, follow all instructions carefully. We were able to give you a rough idea of the procedures involved, but the accuracy of your findings could vary if you start free lancing on procedures.

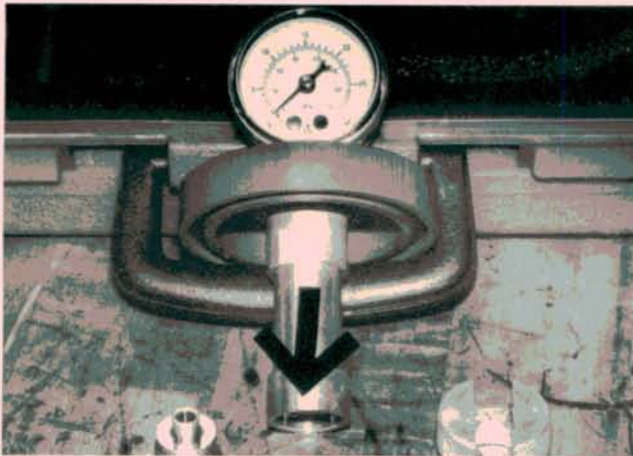
Available from:
Miller Special Tools
Circle No. 200



Water and alcohol combine and settle out of fuel. Add 2 milliliters of water to 10 milliliters of suspect fuel. Shake the mix and allow it to settle. Using the instructions in the kit, calculate the percentage of alcohol in the fuel and compare it to the manufacturer's recommendations.



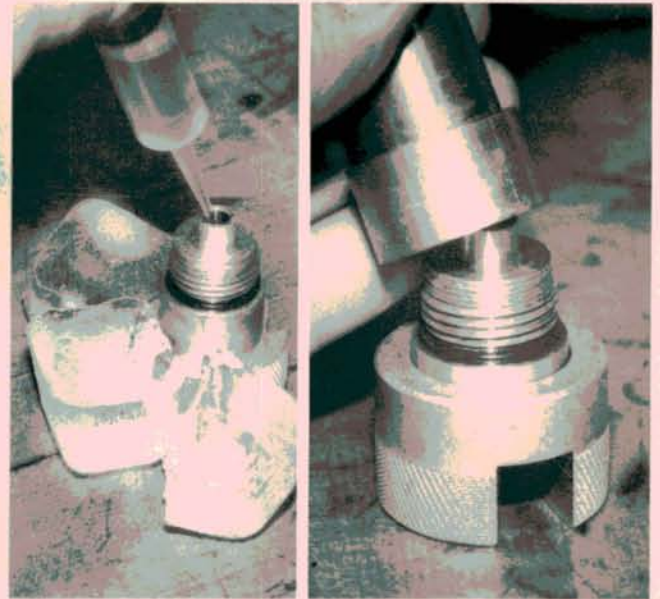
Take a fuel sample. Chill it and the fuel cup and holder. We're going to chill the fuel, then warm it and measure the pressure it gives off as it vaporizes. Certain fuel additives can make the fuel vaporize at lower temperatures. Fuel percolation or vapor lock can cause all sorts of problems.



We want to chill the fuel. But we want to warm the pressure tester. Fill the thermal cup to within $\frac{3}{4}$ inch of the top with warm water of 43.3 degrees C (110 degrees F). Place the fuel chamber (arrow) in the water to warm it. If the temperature drops below 40.6 degrees C (105 degrees F), reheat it.



Here's a better view of the assembly. Here, we're warming the chamber. Later, we'll screw the chilled fuel holder into it. The thermometer at the left is inserted in the lid just behind the pressure gauge. Water temperature will be an important part of our final calculations.



Once the fuel and the fuel cup are cold to the touch, we can take a syringe and fill the cup to within $\frac{1}{8}$ inch of its top. Put the fuel cup in the holder. Remove the air chamber from the warm water, shake it dry and quickly put the assembled fuel holder/air chamber assembly in the warm water.



Let the assembly sit for two minutes. Then hold the assembly firmly, tilt it downward at about a 45 degree angle and shake it with enthusiasm. Turn the assembly upright and write down the gauge reading and the temperature of the water. Compare the readings to the chart in the kit to calculate Reid vapor pressure.