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Fuel System Basics

In keeping with the topic of gasoline, this month we will address the fuel delivery system of your car. This includes the fuel tank itself, all the lines, one or more fuel filters, a fuel pump, and the fuel metering components.

So, first you take your off your gas cap. You may hear a “whoosh”. This is air going into the gas tank because the cap actually seals the fuel system to prevent fuel vapours from discharging into the atmosphere. An important note to be made here is if the “Check Engine” light comes on, check your gas cap. If the cap is loose, or if you have a defective cap, the computer detects an EVAP leak setting the light on. If your cap is tightened and the computer detects no leak on the next 3 cycles, the light will go out.

When the nozzle is put into the filler neck, the fuel goes down into your fuel tank. A float measures the fuel level of the tank. (Similar to the float in your dehumidifier) A vent line in the tank is connected to an activated carbon or charcoal filled canister in the engine compartment, which collects vapours from the tank until they can be purged later for combustion in the engine.

Electric fuel pumps are most often mounted in the fuel tank, and immersed right in the fuel. The fuel actually helps to cool the pump as well as making it easy to pick up the fuel. In most tanks, there is a fine mesh screen “sock” attached to the inlet port, which takes fuel to the fuel pump. This sock is used to pre-filter out large particles of rust or debris, which could easily damage the fuel pump. The pump uses a vane or impeller driven by an electric motor. The vanes draw the fuel in through the inlet port then squeeze the fuel into a tight passage. This pressurizes the fuel. The pressurized fuel exits through the outlet port to a filter in the fuel line to a fuel rail leading to the fuel injectors. One might wonder if there could be a danger of explosion in the tank from the electric motor immersed in gasoline, but due to the closed system there is a shortage of oxygen to support combustion. Once into the fuel injectors, excess fuel and any air bubbles are routed back to the tank via a return line. This ensures that the fuel is always kept cool and free of bubbles.

All fuel systems have at least one other filter located between the fuel tank and the engine. On some models, the filter is part of the fuel pump itself, on others; it is located in the fuel line en route to the engine. Fuel filters should be replaced once a year, preferably in the fall before the colder winter season. At the same time the system should be routinely check for leaks. Inspect all the fuel lines and hoses for cracks, leaks and deformations. Any type of damage should be fixed immediately. At this time you may also consider having a fuel injector flush to clean wax from the injectors and carbon the combustion chamber areas.

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