

Fuel Pump Tech

Location, location, location....Dirt Late Models have fuel pump problems. Some of the new billet diaphragm pumps will feed over 800 horsepower and are pretty dependable, but the location is still the equivalent of a former landfill.

Small block Chevys have the fuel pump in a very bad position, on the right front of the engine, next to the cross member with the lines hanging out the front. Minor wrecks can break the lines and/or the fuel pump off causing a fire that is feed by the fuel cell being higher than the pump. We have all seen it and many have experienced it. Help is here, the new piston pumps are much smaller, allowing more frame clearance and the ability to have the pump and fuel lines behind the front of the engine. The likelihood of having a fire caused by the fuel lines or pump being broken off in a wreck are all but eliminated.

The new block mount billet piston pumps are the first completely new fuel pump design in over 50 years. The pumps are fully machined from hard anodized solid aluminum billet and equipped with Teflon seals and stainless steel components to make them impervious to all fuels. They work on engines from 200 to 2,500 horsepower. They are the height of simplicity with just one moving part and bolt in the stock location using the stock pushrod.

The design is "high pressure, variable displacement". This design utilizes a pressure regulator, but does not require a return line. The pump adjusts its output to demand. This is much simpler than you might imagine. The engine drives the piston on the inlet stroke while an internal spring drives in on the outlet stroke. As pressure increases between the pump and the regulator, an indication that the engine is using less than the pump can flow, the internal spring is unable to push the piston its full stroke. For example, the pump may be making .300" strokes when the engine is producing 2,500 horsepower. When the throttle is released and the engine is still turning high RPMs but using little fuel, the pressure builds up between the pump and regulator, shortening the piston strokes to as little as .005". This same pump installed on a street driven vehicle may never make strokes greater than .050".

Less pressure is placed on the camshaft than with a 15 PSI diaphragm pump. This is due to the efficiency of the piston design. The area is only .79 square inches, so it takes .79 pounds of force to generate 1 PSI and 79 pounds of force to generate 100 PSI. A typical diaphragm pump has a 3.5" diameter diaphragm, or 9.6 square inches, this requires 9.6 pounds of force to produce 1 PSI and 96 pound of force to produce 10 PSI. Less than ¼ horsepower is consumed by the new pump, less than any previous designs.

Regulators designed for use with the block mount piston pump are hard anodized billet aluminum like the pumps. They feature a lightweight ceramic valve made of the same material as aerospace ball bearings, seating directly against a hard anodized aluminum seat. Traditional regulators use a heavy steel valve against a steel seat. This combination allows the regulator to "flutter" at lower speeds. Fuel pressure is much more stable with the lighter valve and hard anodized aluminum seat.

One moving part makes the piston pumps extremely dependable. An endurance test was conducted simulating 240,000 miles of use with no problems. The piston pumps and matching regulators are manufactured from hard anodized 6061-T6 solid aluminum billet with Teflon seals and stainless steel components. A simple design with premium components makes for outstanding durability.

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