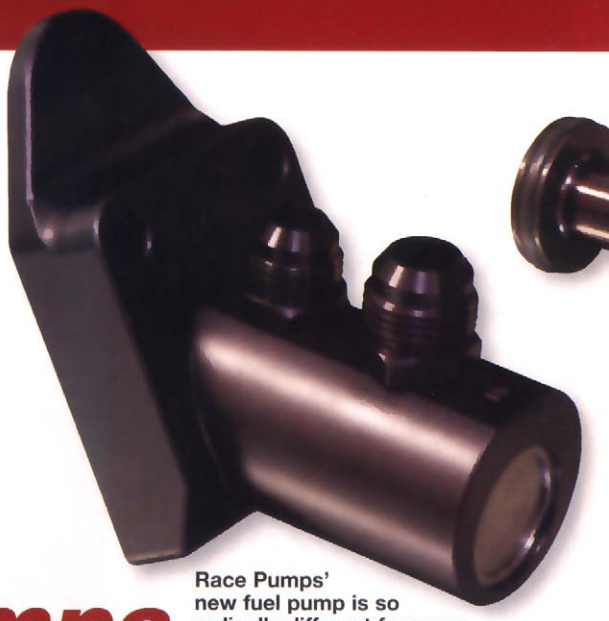


Race Pumps' new fuel pump is so radically different from anything else out there that its pump design is patent pending.

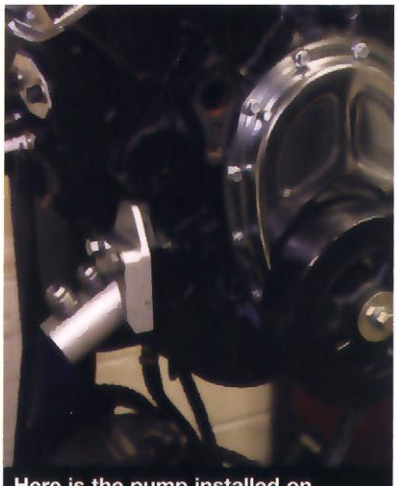
High-Flow Fuel Pump from Race Pumps

Text and Photography by Jeff Huneycutt

Engineer Howard Stewart says this is the fuel pump design he's been working on and improving for the last 16 years. Lucky for us, he's finally ready to allow the rest of us to play with the finished product. Sold under the name Race Pumps, his valveless, variable displacement piston fuel pump has a clean-sheet design and is radically different than anything you've seen when it comes to moving fuel from the tank to your carburetor.

The problem, Stewart says, is that the conventional fuel pump design isn't efficient. It works on a diaphragm design and uses a pushrod moving in and out to push a lever on the pump that moves up and down. The typical conventional fuel pump requires 125 lbs. of pressure on the pushrod to operate, and that's a lot of drag on a race motor.

In comparison, Stewart's design uses a piston to pump the fuel, which moves in the same direction as the pushrod. This reduces the required loading to between 25 and 35 pounds. The reduced force required not only frees up power but also reduces the wear and tear on the fuel pump pushrod. Because the pushrod is oiled only by splash, many racers using high-rpm engines are forced to use pushrods with brass tips to make sure that only the pushrod, and not the pump itself, wears. This new pump can be run with a standard pushrod with no problems.



Here is the pump installed on Stewart's test rig. As you can see, it takes up minimal space, and the vertical inlet and outlet fittings protect the fuel lines in the event of a crash.

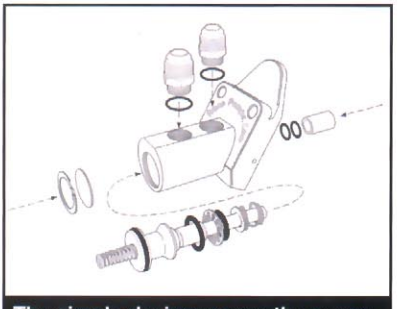
The design of the pump itself is completely new and patent pending. It uses a plunger-type system to move copious amounts of fuel in free-flow mode. Unregulated, the pump will flow at 60 psi and move over 200 gallons per hour. Theoretically, it is enough to feed a 2,800-plus horsepower motor and be used with either alcohol or gasoline. Interesting, though, is the fact that although the pump is capable of extremely high pressures, it doesn't waste energy once that pressure is attained. The plunger-style pump is pressed in using the fuel pump pushrod but uses a spring in the back of the housing to push it back out. If the line pressure on the outlet (between the pump and the regulator) reaches a certain point, the spring cannot push the plunger back out, and the fuel pump essentially "waits" until the engine has consumed the fuel and is ready for more.

Because of the extremely high flow and pressure capabilities, a regulator is required. Stewart says this is a design advantage because a properly operating regulator can help make a car feel more predictable from the driver's seat. That, he says, is because the fuel pressure to the carburetor is constant. According to Stewart, conventional fuel pumps simply cannot push enough fuel to make a regulator worthwhile. The result, in many instances, is the carburetor stumbling at the end of the straights as it tries to feed more fuel to the engine than the pump can supply. A high-flow pump and regulator eliminates that.

A secondary advantage to this pump design is that it relocates both the inlet and outlet lines on top of the pump. This protects the lines behind the motor plate and significantly reduces the chances of a fuel line getting knocked loose

None of the parts used in the pump are off-the-shelf. Even the fittings are made to Howard Stewart's specs. The material used in the O-rings is impervious to both gasoline and methanol, so the pump can be used interchangeably on both types of engines.

A captured O-ring eliminates the need for a gasket and facilitates easy tear-downs.



The simple design means the pump weighs in at just 1.1 lbs. Wear is minimal, but if any trash enters the fuel system and damages the pump, it is factory rebuildable for $50.

in the event of a wreck. The pump is supplied with a -10 AN inlet and a -8 outlet. If used with an alcohol motor, the -10 inlet is a must. If you are burning gasoline and wish to use a -8 inlet, a second fitting is also included.

Currently, Race Pumps has high-flow pumps available for Chevrolet small-blocks. Designs to work with Ford Windsors were also in the works at the time this went to press, and units should be available soon. ***CT***

SOURCE:
RACE PUMPS
336/476-9583
WWW.RACEPUMPS.COM