Choosing the Correct Fuel Pump

Different fuel pump manufacturers rate their fuel pumps in different ways. Some manufacturers for instance rate their fuel pumps at free flow. The problem with this rating is that no fuel system operates at zero psi. Other fuel pump companies may rate their fuel pumps at a given psi. For example, the Walbro fuel pumps that we sell are rated at 40 psi. Our most popular fuel pump we sell is the 4 series fuel pump assembly. These assemblies use a Walbro 255 lph fuel pump. 255 liters is the volume of fuel that the pump will flow at 40 psi. While this is a more accurate rating than a free flow rating, the 255 lph rating is only accurate if you are running your engine at 40 psi and your pump is being supplied with 13 volts.

Sometimes pumps are rated based on pressure. For example, the Walbro 255 lph pump can produce a pressure in excess of 100 psi. While this information may be relevant, it only provides one detail about a fuel pumps capability.

The better way to select a fuel pump to use in your fuel system is to consider three factors:

1. **How much horsepower your engine will produce.**
2. **What fuel pressure is required for your engine.**
3. **How much voltage is supplied to your fuel pump when the engine is running**.

1. Horsepower

The amount of horsepower that your engine has will determine how much fuel flow is required to support that engine. As horsepower increases so does the volume of fuel required to support that power. A good estimator of volume to power is approximately 10 hp per gallon or 2.64 hp per liter. For example, if your pump flows at 50 gph it should be able to support a 500 hp engine (50 x 10 = 500). However, to know the gph you must also consider the fuel pressure required for your engine.

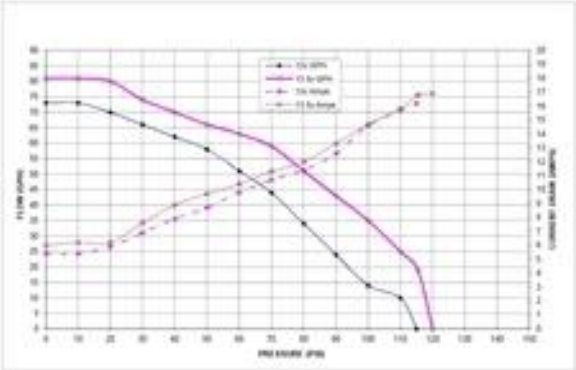
2. Fuel Pressure

Different engines require different fuel pressure. For example, a carbureted engine typically requires between 4 to 7 psi whereas a typical GM LS engine runs on about 58 psi. Furthermore, if you are running boost the pressure required for your engine may increase under load.

It is important to know what the max pressure your engine will require because fuel pressure has a large effect on how much flow a pump can produce. A fuel pump will flow at its highest volume when there is no pressure (free flow). As fuel pressure increases, fuel flow decreases. Every pump has a different flow volume at a given pressure. Because of this it is important to look at a flow chart of whatever pump you decide to buy. As free flow, or even flow at a given pressure is only part of the equation.

3. Voltage

Fuel pumps have different flow rates at different voltages. As voltage increases so does the speed of the fuel pump which will increase the flow of a pump at any given pressure. Because of this it is good practice to see how a pump is rated at a given voltage. Most cars will produce about 13.5 volts when running. However, if your alternator does not produce 13.5 volts, or you simply want to plan conservatively simply look at the flow ratings of a pump at 12 volts.



Putting it all together: Fuel Pump Selection

Now that you understand the three main factors that you should consider when selecting a fuel pump you can put all that information together and get a good idea of how much horsepower a given fuel pump can supply for a specific setup. All that you need is a fuel flow chart of the pump that you are considering.

For example, take a look at our GPA-4 fuel pump assembly flow chart above.

Now let's assume that your engine requires 60 psi and your fuel pump will be supplied with 13.5 volts. As you look at the chart you can see that at 60 psi and 13.5 volts this pump will flow at 63 gph. Using the 10 hp per gallon rule we can assume that this pump will support up to 630 hp (63 x 10 = 630).

If you use that same pump on a carbureted engine the pressure required for most carburetors is under 10 psi. Again assuming 10 psi and 13.5 volts the chart shows that the pump will flow at 81 gph. So, this same pump will support 810 horsepower on a carbureted car (81 x 10 = 810).

As you can see from the two examples above the pressure required for your engine drastically changes the amount of flow a pump can produce which in turn affects the amount of horsepower a given pump can support.

Keep in mind that it is always a good idea to estimate conservatively when selecting a pump. Figure your horsepower on the high side so that you have a large enough pump for your system. If your pump is larger than what your system requires the excess fuel is simply returned to the tank through the fuel return line.

Horsepower ratings can be figured by finding the flow rating in gph or lph at a given pressure and voltage.

Once the flow is figured out on the flow chart, horsepower can be figured as follows:

10 horsepower per gph

or

2.64 horsepower per lph