



Why flow my fuel system?

Save parts carnage, get on top of the tune up quicker, start with a tunable fuel system are only a few of the reasons why to flow your fuel system. Five different fuel pumps of the same brand and size will all flow slightly different volume and lose different amounts of volume when the pressure in the system gets up high. An accurate flow bench will tell you exactly how much fuel you are giving your engine. If your car is running in top form then you need to know what amount of fuel your engine is getting throughout the entire rpm range. Should your fuel pump decide to wear out (they do) and you put a new one on is it better or worse than what you had. A common situation is that someone will start racing and have a slightly rich fuel curve because everyone should start "safe" and find their tune up. Over the period of many races they sneak up on the tune up slowly and safely and get the car running real well. What has happened is while they were sneaking up on the main jet (taking some fuel away) the pump was wearing slightly as well taking some fuel away as well. Eventually the fuel pump fails and you have to put a new one on. If you just put a new fuel pump on the engine at this stage the car would slow down and would be difficult to find out why. Would it be better to know exactly how much fuel you were putting in the engine at each RPM step so you could duplicate this any time that you want? If your car is not running in top form a flow bench can give you a place to start your "tune up". Either way you have solid numbers with which to make future changes or a base line to start with. Are you afraid someone will steal your top performing "tune up" if you send the system to LOWE Fuel Injection Systems? We pledge confidentiality, but that aside when we get your fuel system to run we take all your components, set them up on the bench and perform a series of tests. Usually the top teams will tell you what tests to perform in detail. We don't know which test they are actually using on a particular run. Besides we have found that the same fuel system on two different cars will result in two different performances due to other conditions such as clutch, tire, gear and launch rpm, to name a few. If a team is just getting started or has never had their system on a flow bench then we can help with a series of practical tests. For example we will base line the fuel system as they are running it now providing fuel volume numbers up and down the range then try a series of jets for the base line, then move the high speed pressures up and down to show exactly what changes effect the system and provide precise fuel volume numbers, so when you make a change at the race track you KNOW what your engine is getting .. it can surprise you. Some changes you make you will think you are making big changes and it changes very little if any at all. This is information that you must have to find your way quickly to a fast tune up.

Who is KEN LOWE FUEL SYSTEMS ?

I have built 5 fuel flow benches in the last 30 years. The first fuel flow bench was not very accurate and what it demonstrated to me was how very important good data was. You cannot cut corners on the instruments, bad data is worse than no data at all. It is like building an engine with a tape measure and not a micrometer. You must know exactly how much fuel volume you are flowing at each step of the curve. Anything else is just not good enough. I have spent over \$10,000.00 dollars on having the best most accurate instrument quality laboratory grade measuring devices that will read the flow information but do not affect the flow or pressure in the system. This will represent exactly what you will have on the car while it is racing. Some flow benches only use dead weight poppet type flow meters. These may be accurate (or not) but they are analogue and do not have a digital read out. More significantly the poppet that floats on the stream of fluid passing by it causes internal system pressure that is not present on the race car during a race and therefore creates an artificial environment in the fuel system altering the flow and pressure numbers from the actual race configuration. The can alter the system pressure by as much as 30 psi and this is 30 psi restriction that does not exist in your race car while it is racing. The second and third were constant upgrades of hardware and more accurate data collection. The fourth flow bench was the best one I had ever built. It had the best, most accurate data collection and could perform repeatable tests throughout a long test day. This flow bench was tested and compared to Walt Austins flow bench in the USA. I took a fuel pump and ran it on their bench then took the same fuel pump and ran it on our bench and got identical results. Now, when I say 13.35 gpm that is what it is. No more no less. As another point of reference we have compared our flow bench flow and pressure numbers to a Race pack on board computer flow and pressure numbers and got a match there as well. The reason I sold that bench hardware is that it wouldn't run up to speed with the 50 cycle over here and I had some ideas for re-con figuring the hardware to make the bench easier to operate. This is important when you spend days in front of it. I brought all the data collection instruments from bench #4 with me so I still have all the same instruments here that I had over there. I have compared the flow numbers of the electronic flow metres to some of my old standard float flow meters to ensure the accuracy over here as well as to flow one of my fuel pumps (good old #2) on the bench here to compare with the flow numbers I got on the electronic digital flow meters in the USA. This ensures continuity of the data. Recently I did a piggy back test using our instruments and a new Race pack on board computer. After the test a comparison of the results were done and the data was perfect in almost every point of comparison and in the variances were less than .01 of a gallon per minute!! We have purchased a electronic computerized jet program to model new fuel flow curves simulations. This is very handy to "rough in" new ideas although we have found the mathematical presumptions inside the software don't always reflect real conditions and unless actually flowed to find the real volume and pressure numbers you will be operating with incorrect information. One example us by moving a poppet and jet (high speed) from the top of the pump to the back side of the barrel valve **will** change the fuel curve and software cannot calculate this,

only a high accuracy wet flow bench can show you this difference. There are other conditions only a wet flow bench can show you as well.

If you have the most accurate flow bench possible how do you make it better?

We create devices that help us represent the actual operation environment the fuel system has to operate in. Example: If you have 100 psi fuel pressure spraying into a intake manifold and the manifold has 45 psi supercharger boost pressure then the fuel flow is based on fuel pressure of 55 psi not 100 psi, because the boost pressure is pushing against the fuel coming out the nozzle and this affects the flow to the engine but not the fuel pressure in the fuel system. We have a device on our flow bench that allows us to duplicate the intake manifold pressure in the fuel system and accurately represent the fuel flow that your engine really gets.

We continually push ourselves to get better. We want to keep the technical lead that we have. Our flow bench now gives us very accurate information and now we are computerizing the data acquisition on the flow bench to give us a larger volume of information. Once the flow bench data acquisition is operational we can give the customer (you) more different combinations of main jets, pump sizers, high speed jets and nozzles. With this you can change your system at the track and know what you are flowing to the engine just by reviewing what main jet and high speed combination you have. Another feature of the computerization is we can ask the flow bench to make a run for us by setting the starting rpm at one point and the finish rpm at another point and setting the ramp time from point to point. The flow bench will make the run starting at one rpm and finishing at the end rpm and do it within a specified amount of time. Example we can set the start rpm at 3000 rpm and the end rpm at 8500 rpm and set the ramp time at 2.2 seconds or 6.8 seconds, whatever amount of time we want to set the test for and the flow bench will make the test with those parameters. Why do you want to do this? We feel that the acceleration of the fuel in the system (especially high volume applications) can and will change the flow rates that the engine actually gets. Another benefit will be the ability to pick any 5 tests and graph them to a computer monitor review the curve and then load this information to a color printer so you can visualize the difference from one curve to the next. There is no other flow bench in the world that has this capability.

What do you need to test the fuel system ?

On supercharged cars all I need is the hat with the nozzles, lines and barrel valve, the port nozzle lines, the pump and inlet fitting and the lines connecting the pump to the hat. The more you send me the more I can help if I see something that can be a problem. I do not need the blower manifold on a supercharged car. Although the blower manifold design can cause some problems as well, usually I can tell you how to test it at home. You won't believe how many "factory made" manifolds are not very good. On non supercharged stack type fuel injection I do

need the manifold as on these the barrel valve is connected to this manifold and I need it all to be able to adjust it here. How long does it take to do ? Usually I can turn it around in a week but most time just before a big race we do get backed up some so please don't wait until then to get it done. Please call us though as we might be able to squeeze you in with a little overtime work here.

How do I ship it ?

Completely drain the fuel out! Take air and blow the system dry as no shipping company likes to deal with soggy boxes. Soggy boxes can fall apart and possibly lose some of your valuable fuel system. Wrap each item with bubble wrap and some clear tape. Once each item is wrapped find a box big enough for all the items to be packed in. I do **not** recommend using Styrofoam as a packing material as it flakes off and gets in EVERY fitting, hose and poppet and must be thoroughly cleaned before we can flow it. Pack the box TIGHTLY as you do not want the parts shifting around inside the box. Be sure to wrap the barrel valve in something soft to protect it and the linkage. Use large plastic bags, or trash bags to wrap the injector and components in to help keep them clean. The cavity or the inside of the injector hat is not a good place to ship the pump as it can move around and damage the nozzle holders. Be sure the parts can't move inside the box because if they can they will damage each other. Please include as much data about your car as possible as this helps us get your base line closer. If you need a flowed fuel injection data sheet call us and we will fax one to you. Note: Be sure to insure the shipment as things do get lost or damaged sometimes. Call us and tell us you are shipping it to us so we can expect it.

Running a race car without flowing you fuel system is like walking through the forest in the dark with your eyes shut. You might get through without bumping into a tree but your chances aren't real good and it is painful if you do bump a tree. We are in the business of pain prevention first or pain relief last

We can supply you with a complete fuel system, flowed or non-flowed assembly, and components or just advise. I guess the best reason to buy you fuel system from us is when you do, you get the correct parts. If you purchase used components from someone you need to know the parts are in good condition and the correct size or configuration for your application. For additional info call Ken.