



Since every carburetor is hooked up to an intake manifold, we would like to provide some plain-English guidelines and information regarding what they can do and not do. I am

sure that all of us have seen, at one time or another, the huge "high-rise" intake manifold that either has one or two four barrel carburetors with a hole cut in the hood. The carburetors are sitting up in the air about 18 inches above the hood. That is wonderful if all we are going to do is drag race and never drive the vehicle on the street. It is possible that some of us may want to drive our vehicles somewhere between stopped and wide open, meaning at normal highway and city driving speeds. Like carburetors, matching an intake manifold to what it is you are trying to accomplish will have a great deal of influence on how well your car performs.

Let's talk about two basic types of intakes:

## DUAL PLANE INTAKES

These are the type of intakes normally used on street-performance vehicles. The intake manifold actually has two levels or planes. One plane of the intake is fed by one side of the carburetor and will feed two inboard and two outboard cylinders. The other plane is fed by the other side of the carburetor and will also feed two inboard and two outboard cylinders. So many people think that one side of the intake/carburetor feeds one side and the other side of the intake/carburetor feeds the other side of the engine. This is truly not the case. A dual plane intake manifold can be a low-rise, mid-rise or high-rise configuration. The difference between the low-rise and high-rise is how high the carburetor will be above the head/valve intake ports. The higher that the carb sits above the intake ports, the more gradual that the passages will be to get the air/fuel mixture to the heads. It's just like driving a car around a corner; the more gentle the corner, the faster you can go. It all gets back to basic physics. Dual plane intakes provide a relatively strong pulsation signal to a carburetor;

this makes it easier for the carburetor to meter fuel for all driving conditions. We will talk more about these pulsations.

## SINGLE PLANE INTAKES

Most single plane intake manifolds are designed as an open plenum underneath the carburetor. All intake ports for both heads come off this central plenum. This will cause less restriction and provide better airflow at higher engine rpm. The drawback, however, is that at lower speeds, the velocity of the air is very slow. This leads to poor low-end drivability and torque characteristics. Single plane intakes belong on the drag strip or racetrack and should never be used on street driven vehicles. That being said, if you want to make the most horsepower and your vehicle has two speeds (stopped and wide open) then a single plane intake is ideal.

We will now elaborate on the concept of "pulsations." With a dual plane intake the pulsations, which are caused by each intake stroke, are separated further apart. The pulsation is only taking place on one-half of the intake manifold, due to each side of the intake feeding four cylinders versus eight cylinders. With the pulsations further apart, they are stronger and therefore give the carburetor a stronger signal from which to meter fuel. One of the drawbacks of single plane intakes is that with the plenum design and the fact that all eight cylinders are fed by that single plenum, the pulsations are much weaker. A carburetor that runs well on a dual plane intake will run extremely lean on a single plane intake at low speeds.

We consistently advise our clients, if they need to spend money on an intake, that they take a factory intake and do some port matching and polishing. Edelbrock makes some of the intakes that do have problems, these include the Performer. The real problem with this intake is that the mounting flange is narrow (narrower than the base of the Autolite 4100). To use the 4100 you will need to use a 1/8-inch thick metal spacer plate to allow it to function without vacuum leaks. The Shelby high-rise intake also has a narrow mounting flange. From the factory, the Shelby Hertz cars used the Autolite 4100 HiPo and used a 1/4-inch Bakelite spacer plate between the carburetor and the intake manifold. The fact that the aforementioned intakes (and others) are made of aluminum certainly

gives some advantage in weight. The truth is that a mid- or high-rise manifold is only going to help you if you are consistently running the engine between 5000-8000 rpm. For typical street driving performance they are not going to help you. We see an awful lot of money spent on the lighter, higher performance intakes that are really not going to help the end user at all.

The real intake issue that we have seen in the last couple of years is the "Air gap" intake. Again, this product is designed for racing only. I am not sure that it is marketed as "racing only," but let's discuss the two laws of physics that apply. If you are trying to win a drag race by getting to the end of a quarter mile faster than anybody else, you'd want the air and fuel as cold as you can get it. This is called density altitude. With the air more dense, you can get more oxygen per cubic foot and more fuel per cubic foot. More gas exploding in denser air gives you a stronger explosion. The other law of physics that is even more commonly used is that if you want good drivability, efficiency, and performance you want the carburetor as hot as you can get it. That is why engineers (from all manufacturers) have put "hot spots" underneath carburetors for years. Sometimes using hot water from the engine's water jacket creates the hot spot, but more commonly it is from an exhaust port. By creating this hot area, gas is atomized closer to vapor. You all know from our discussions about annular fuel discharge that fuel vapor burns easier than liquid. Here comes the new Air Gap intake that is going to make sure that the air/fuel mixture is as cold as you can get it. It is amazing that people will buy almost anything that seems to be new.

Which of these laws of physics you follow depends entirely on what you are hoping to accomplish. Most of us are just trying to fulfill the "human need for speed" without sacrificing our vehicle's drivability. Using your car's factory cast iron intake with its dual plane design is the best and most cost effective option.

As always, we invite your comments and questions regarding any of our "Good Carbs" articles.

If you have questions or comments, please contact me via email at [sales@ponycarburetors.com](mailto:sales@ponycarburetors.com) or by phone, toll free, at 866-662-3003.