BIG97. Your frequently Asked Questions.

The more you ask, the longer this How-To will grow

I am building a very healthy 302ci flathead with an old wide-spaced 2x2 intake and direct linkage. Do I need two Primaries, or two Secondaries, or one of each?

Any direct linkage set-up must use Primary carbs only. We have not tested yet whether BIG97s could run 2x2 on a progressive linkage (one Primary, one Secondary), but we suspect most flathead intakes don't have the best distribution in them to serve the whole motor from one end of the intake. Keeping the pair the same will help ensure all the ports get equal flow. Be aware, of course, that to get the best from the BIG97 you need to open up the carb mount ports a little on top of the intake. There are instructions on the website Tech Center. They will also need a little de-jetting if you're running two.

I've got a 1936 Ford Flathead V8, essentially stock, but bored out 0.080" for about 251ci. What sort of benefits would a BIG97 bring or would it flow too much?

The BIG97 is a direct replacement for any regular 97. It is the same on the outside as you can see on our website. The inside has more cfm capacity plus improved power valve circuits for better fuel efficiency. First off, yes it would work great. And secondly, it would not flow too much, as the engine takes what it needs, never the other way around. What the engine 'needs' is a simple math calculation of cylinder volume x rpm. It may be jetted a little too rich for a flathead as it comes jetted as a centre carb for a small block Chevy Tri-Power.

As for the performance benefit, we have covered that above as regards reducing the vacuum the engine has to pull and the power used to get it. Lower vacuum promotes higher air/fuel density inside the intake manifold and combustion chamber. And turbulence is reduced too. All good for performance.

Why build a bigger 97? My Chevy runs great on three old 97s.....

Here are three good reasons for a start:

1. With any engine, the manifold vacuum created at open throttle is dictated by the restriction above it, ie. the carburetor size. The air it needs is fixed by cubic capacity, So the smaller the carburetor, the more vacuum it has to pull to get that air, and the more of its own power it uses to get it. So if we increase carburetor capacity, we reduce the vacuum the engine has to pull and the power used to get it. Than means more power for your rear wheels.

2. Lower vacuum also promotes higher air/fuel density inside the intake manifold and combustion chamber. And a dense air/fuel charge is good for performance.

3. The biggest enemy of intake system flow is turbulance in the air/fuel mixture exiting the carburetor. BIG97s have bigger, better shaped passages through the carb which not only reduce turbulence, but reduce mixture velocity at the carburetor exit, which allows our denser, fuel-heavy air an easier, more efficient turn into the inlet manifold. The overall result is higher mixture flow and better distribution of the air/fuel mixture because of the lower vacuum required to get the airflow we need, and lower turbulence. In a recent Car Craft magazine, Jeff Smith quotes a story from Edelbrock...'Back in the '80s, Kenny Duttweiler was testing a Buick V6 engine on Edelbrock's dyno and discovered significant power increases when he adapted a 1050-cfm Dominator carburetor to the little V6. The engine didn't need the additional airflow, but it did respond positively to the larger carburetor, because it reduced the air velocity exiting the carburetor. This allowed the heavier fuel traveling at a slower speed to make the transition from vertical flow out of the carburetor to horizontal flow in the intake ports.

It is a common misconception that a street carb needs small venturis for good driveability and throttle response. A bigger carb that meters fuel efficiently at all engine speeds will have driveability as good as a smaller carb. The key is calibrating the fuel metering circuits to achieve that efficiency. Larger carbs, properly designed and calibrated, do not trade low speed driveability for top end power.

But my cfm calculator tells me that 600cfm is perfect for a Small Block Chevy?

Ok, so if we use the traditional equation for cfm requirements, a 350ci engine turning 6,000 rpm at 100 percent volumetric efficiency (VE) needs 607.6 cfm. If we assume your crate engine makes 80% VE at best, it's even less. So how come every aftermarket tuner and racer knows that engines make more power with bigger carbs? Because carburetor flow ratings are taken at an arbitrary vacuum drop — 1.5 inches of Mercury (Hg) – and there's no guarantee that, at max-rpm wide-open throttle (WOT), our 350ci motor actually sees 1.5inHg vacuum. Most hot, dual-purpose cars pull more like 1.0 inHg manifold vacuum at WOT. So actually if it did see 1.5in, it would be telling us that the carb is too small because the engine has to pull too much vacuum to get the air it wants. Which brings us right back to Reason Number 1....see above!

And why a tri-power?

What, apart from traditional hot rod looks? The BIG97 Tri-Power has Primary and Secondary carburetors in the same way as a 4-barrel carb has primary and secondary sides. It runs on the two primary barrels at low throttle then brings in the secondaries higher up the rev range when the engine needs more cfm. Opening all four throttle plates (or six on a tri-power) simultaneously would make the engine more difficult to regulate because very small movements in the throttle pedal could make big changes in the power output. And no-one wants a jerky driving style. A 4-barrel with 1:1 linkage to the secondaries has the same jerky, low speed driveability issues, more evident with a manual transmission than automatic, and even worse if your clutch has little ability to slip from standstill.

Instead, the BIG 97 Tri-Power runs a progressive linkage, opening the Primary carb first, for smooth, controllable driving in normal street use, then plenty more power when we punch in the outer Secondaries. Of course, by splitting the total available cfm into three, a tri-power has even more adjustability than a 4-barrel, especially as our secondaries are mechanically operated. We can time exactly when the Secondaries open, how quickly and how far open we want them at WOT.

Why are there idle circuits and chokes in the secondaries?

As part of our BIG97 design and development process, we made a lot of dyno tests, working out how to get the best out of the new carbs as a Tri-Power set-up. The key to a successful Tri-Power is getting a smooth throttle progression from idle, though the transition from one carburetor to three, and then up to Wide Open Throttle. We found the best way to achieve this was with working idle circuits on all three carburetors. It means the Secondaries are not starting at absolute zero when they are first cracked open. And also allows us to set the Secondaries at the factory with the throttle plates just below the transition ports. So when they do start to open, you get that instant hit of extra fuel/air mixture through the Secondary transition circuits. Idle circuits don't suddenly stop when you pull off idle, of course. They simply taper off as you move up the rev range and the main jets take over.

There are chokes in all three carburetors because it is well established (and tested) that Stromberg 97s need chokes to smooth and direct the incoming air past the tips of the emulsion tubes for a stable vacuum signal. Without chokes, the signal (the small changes in vacuum that regulate the correct air/fuel flow through the carburetor) is not stable, and that's bad for any street-use carburetor.

Why do I need to modify my intake manifold?

The BIG97 is a totally new carburetor, based around the traditional Stromberg three-bolt base, but with significantly bigger throttle bores, on slightly wider centers, too. The currently available 3x2 intakes were designed for either regular 97s (3-bolt) or Rochesters (4-bolt). Naturally if you want to get the most out of your BIG97s, you want the ports in the top of the intake to match those in the carburetor, to reduce turbulence and maintai pressure recovery into the intake plenum. If you have an intake for three regular 97s, the mounting stud positions will be correct, but your carbs will benefit from opening up the intake ports (we have a separate How-To covering this). If you have an intake for Rochesters, you will find the intake bores very close to the BIG97, but the mounting stud positions will need adjustment.

BIG97s also benefit from our early plenum effect, helping the two separate barrels of air come together before they hit the intake plenum. This improves pressure recovery and increases airflow capability, but also builds power by slowing the mixture down to reduce turbulence in the transition from carburetor to manifold plenum. Extending this effect into the intake, by removing part of the web between the two ports under each carburetor has further benefits in allowing any cylinder to draw from all six barrels. This brings the strong torque and easy drivability of a dual plane intake with a boost in top end horsepower more usually associated with a single plane.

Do I use regular 97 or BIG97s?

How big is your engine and how many carbs do you want? The final decision will be yours, but we suspect that in the hot rod world most flathead engines will be good with regular 97s. The BIG97 Tri-Power was designed with bigger overhead valve V8 engines in mind. They'll work great on pretty much anything, of course, and still bring improved fuel efficiency. It's just that the benefits of extra airflow will not be so significant on the smaller engines.

Primary vs Secondary BIG97. What's the difference?

The BIG97 Primary features all of the typical 97 fuel circuits, though the power valve and accelerator pump circuits are significantly modified to improve fuel conditioning. It can also provide ported vacuum for your modern aftermarket distributor. BIG97 Primaries can be used on their own or in multiples (with a direct or progressive linkage).

BIG97 Secondaries have no power valve or accelerator pump circuits. Dummy accelerator pumps retain the classic 97 look. Secondaries are designed ONLY for use in multiple carburetor systems, connected to a Primary model with a progressive linkage.

All three carburetors keep chokes, idle and transition ports. Jetting is slightly different between models as shown on the box.

What air filters do I use?

We have been testing air filters on BIG97s with mixed results. Put simply, there are few currently available air filter housings designed for Stromberg 97s that can pass a full 250cfm in flow-bench test conditions. In truth, many are not even capable of supporting the 162cfm from our regular 97s. This makes scoops a good bet, of course! Having said that, 250cfm is the maximum airflow you will expect through a BIG97 so most engines will only experience that at maximum revs, and many never at all. The key advice is, as with any air cleaner, be aware that lack of airflow can make the mixture rich as you move up the rpm range, with the potential to choke off the carburetor at the top end.

What jetting do I need?

As a totally new carburetor, the BIG97 has no baseline jetting for stock applications. Instead, it was determined through dyno testing, assuming that the carburetors would be used as a Tri-Power on a typical hot rod small block Chevy/Ford crate motor. This is the

supplied jetting even on BIG97 carbs sold individually. Jetting for Primary and Secondary carburetors is different, as detailed on our website and marked on the carburetor box. Alternative jetting may be required for altitude, other and non-standard engines; different multiple carburetion; forced induction or special fuels; and local and seasonal differences in fuel formulations.

For further tuning advice, please see our separate How-To, 'The All-New BIG97 Tri-Power. In Detail' available to download on the Stromberg Tech Center.

As with all our Tech articles, we welcome customer feedback and other input. Email us (tech@stromberg-97.com) with your thoughts and if it adds to the debate, we'll add it in. Thanks for listening.