
JET KIT: DO I NEED ONE?

One question we hear frequently is "I just changed my exhaust, do I need to put a jet-kit in my bike? The answer is depends on the bike and what you expect out of it.

Most stock bikes have very quiet and restrictive mufflers. Taking the mufflers off or changing to some high performance pipes like Vance & Hines or Cobra can bring a good horsepower increase along with a lot louder exhaust note. More exhaust flow means more air is pumping through the engine as well.

If the jetting is left stock, you may get a lean condition which can cause anything from a flat-spot in the power band in mild cases to pinging, detonation, dieseling, and in extreme cases engine overheating.

There are jet kits on the market that are tailored to specific bike/pipe combinations such as the Vance & Hines and Cobra jet kits that come with correct jets for their pipes and these are a good bet for the average bike without too much modification.

Hotter bikes can use Stage 7 or Thunderslide kits from Dyno Jet and require a bit more "tweaking". Many bikes run just fine without any jetting change at all, especially in mild climates though in hot temperatures or extremely cold temperatures re-jetting is more important.

A jet-kit will usually add horsepower as well, especially in conjunction with a good exhaust and air cleaner setup so that should be taken into consideration as well. On most single carb V-Twin bikes with a CV carb the kits can be installed in 45 minutes by the average mechanic and because the cost is modest this is a very cost effective way to increase horsepower.

Ride safe!
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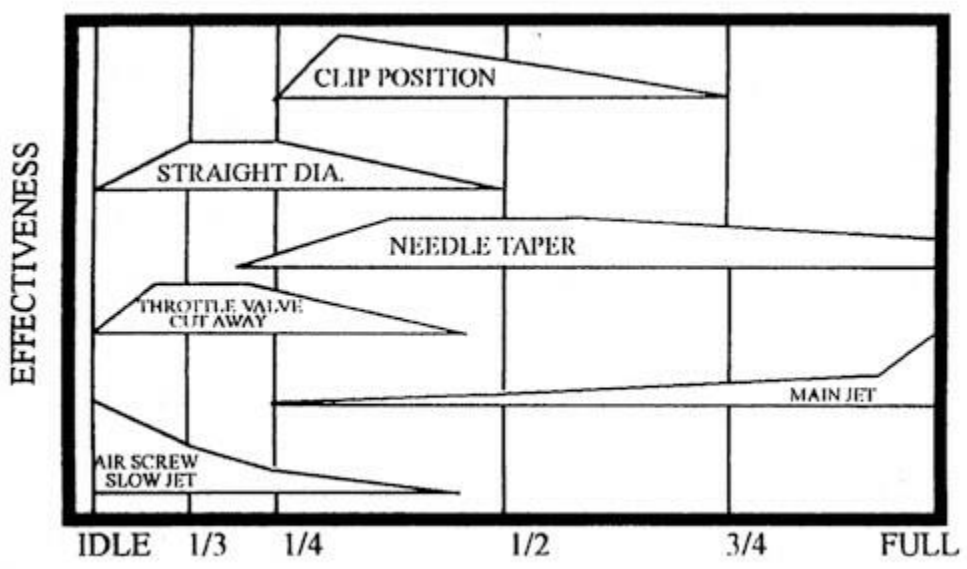

> Instead of a choke (which uses a butterfly to close off the air intake for cold starting), these carbs use a starter jet to add extra fuel into the mixture. That starter jet is located in the float bowl. There's a little hole in the bottom of the bowl that leads to a passage in the side of the bowl. In that passage is the starter jet. It is pressed in at the factory and cannot be removed without destroying something. Descending from the main body of the carb is a brass tube that fits into the passage above the jet. This transfers the fuel to the starter plunger, which is a kind of shut-off valve. When you move the "choke" lever, those plungers all rise, allowing the extra fuel into the air flow for cold starting. As the engine warms up, you must return the lever to close the plungers and return the mixture to normal.

> Right beside those plungers, on the top of the carbs, are the idle mixture screws. They may be sealed beneath some soft metal caps to prevent the owner from tampering with them and altering the emissions. You can remove those caps by drilling through with a small drill bit, tacking care not to go too deep. Then screw a sheet-metal screw into the hole you made a few turns, grab the screw with pliers, and pull. Those screws are for fine-tuning the idle mixture. (We'll get back to these screws in a minute)

They get their gas through the #40 pilot jets mounted in the main body of the carbs, hanging down into the float bowls. Beside the pilot jets are the main jets. They should be #110 on a 650. They take over the mixture duties as you approach full throttle, and feed the needles in the slides with fuel for mid-range operation, but bear in mind that ALL jets have SOME effect at ALL operating ranges, so it's important to get everything right.
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> There's a couple of other jets in the carb too. They're under the chromed cap that retains the slide. These are air jets, and control the position of the slide in the carb. Unlike earlier, more primitive, designs, these Constant Velocity carbs vary the slide height (and therefore the mixture) according to the velocity of the airflow in the venturii. The air jets control that balance.

One other factor that can affect the mixture: restriction. If the air filter is missing or plugged, that can throw the mixture off. Similarly, if you have installed an aftermarket exhaust system, that can affect the mix. (These effects don't usually show up after only 5 minutes idling.)
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> Anyway, back to those screws. Adjusting the 4 carbs to work together is a little tricky. At best. Not only do you have to get the mix right, you have to balance the carbs, so that each cylinder is working equally hard. Otherwise, you end up with 1 or more cylinders carrying the load, and the others just going along for the ride. That balance also affects each individual mixture, especially at idle (because they're CV carbs, remember?)

Two tools are invaluable for this: some means of measuring the vacuum at each cylinder simultaneously, and some means of measuring the mixture. If the bike has YICS, so you will also need the YICS tool (If it has YICS, it will say YICS on each side of the engine on the round cover at either end of the crankshaft). Carb sticks are the best way to measure the vacuum. There's two designs -- one uses 4 mercury filled tubes. As the vacuum increases, the mercury rises in the tube. ProMotion is one brand. The other style uses steel rods that rise up in response to vacuum. You can also use a set of 4 dial-type vacuum gauges, but they're more expensive, and must be calibrated to each other. If you use automotive type vacuum gauges, you will need to restrict the hoses somehow, because the tiny intake passages in a motorcycle carb will cause the needle to swing violently, possibly damaging the gauges.
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> There are two ways to measure the mixture. The factory uses an exhaust gas analyzer and checks each cylinder in turn through that little bolt hole in the bottom of each exhaust header. The other (my favourite) is the ColourTune plug, made by Gunson's in the UK. The colourtune is essentially a sparkplug with a glass window. You put it in each cylinder in turn, and adjust the idle mixture screw (I said I'd get back to it, didn't I ;-) watching the colour of the flame inside the cylinder as the engine is running. It's very much like adjusting an acetylene torch or a Bunsen burner. In fact, the colour you want to
achieve is called 'Bunsen blue'. A yellow flame is too rich, and a white flame (or no flame) is too lean.
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> Once you have the mix roughly set on each carb, you balance them with the carb sticks. Between each carb is a screw linking the throttle butterfly shaft with the neighbouring carb's. #3 is the master, connected to the throttle grip. #2 and #4 connect to either side of #3 and #1 connects to #2. You adjust the screw between #1 and #2 to achieve equal vacuum on those two cylinders. Then you adjust #4 to #3. Finally you adjust #2 to #3. By the time you do all that, #1 and #2 will be out a tiny bit again, and so will the mix. So you start over again with the colourtune, and fine-tune things.

Then back to the carb sticks. Repeat. Eventually you zero in on perfect mix and balance. This must be done anytime you tear down the carbs, and should be checked every spring. Compared to having the dealer do it for you, the tools pay for themselves in about two years.
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Dean Rachwitz forwarded this comparison of the stock needle alongside an adjustable jet kit needle: