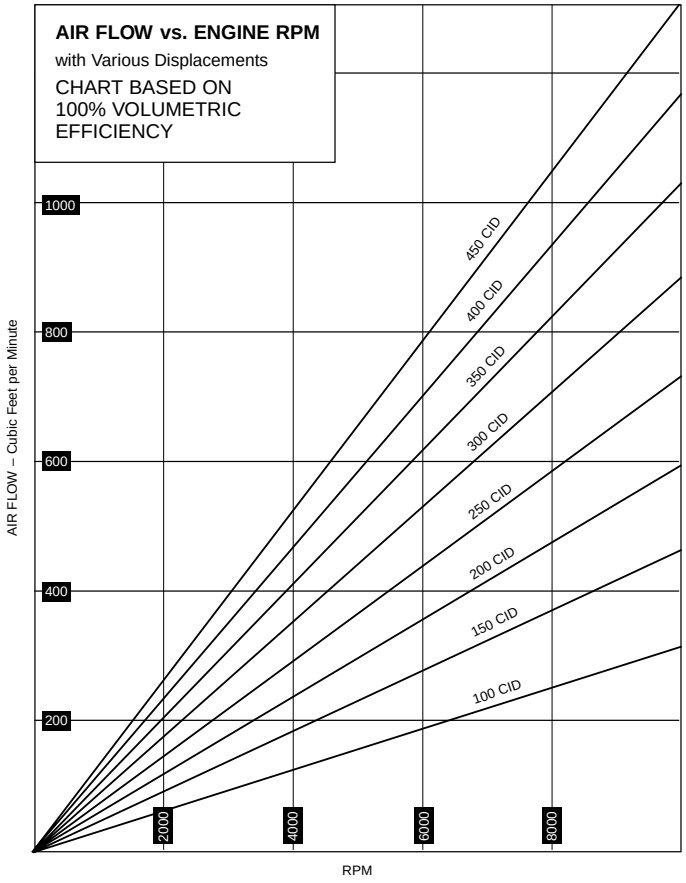
HOW TO SELECT THE RIGHT CARBURETOR SIZE

Volumetric Efficiency
Before you can determine the correct carburetor size for your engine, you must know its volumetric efficiency. Volumetric efficiency is an indicator of how well an engine can breathe. The better an engine's "breathing ability" the higher its volumetric efficiency. It is expressed as the ratio of the actual mass (weight) of air taken into the engine compared to the mass which the engine displacement would theoretically take in if there were no losses. The ratio is expressed as a percentage. It is quite low at idle and low speeds and varies with engine speed.

Volumetric efficiency should be computed at the expected operating RPM or your engine application.

Use the following examples as a guide to estimate the volumetric efficiency of your engine.
(A) An ordinary low-performance engine has a volumetric efficiency of about 80% at maximum torque.
(B) A high-performance engine has a volumetric efficiency of about 85% at maximum torque.
(C) An all-out racing engine has a volumetric efficiency of about 95% at maximum torque.



A highly tuned intake and exhaust system with efficient cylinder head porting and a camshaft ground to take full advantage of the engine's other equipment can provide such complete cylinder filling that a volumetric efficiency of 100%, or slightly higher, is obtained at the speed for which a system is tuned.

The graph below can be used to find your airflow requirement. It's based on 100% volumetric efficiency so any indicated airflow must be multiplied by the volumetric efficiency of your particular engine. Use a carburetor with an airflow rating equal to or slightly smaller than the air requirement of your engine.

Let's take for example, a 300 C.I.D. V-8 which has a maximum RPM limit of 8000 RPM. It's been determined that this particular engine has a volumetric efficiency of 85%. According to our chart the engine's airflow requirement is 700 C.F.M. at 100% volumetric efficiency. At 85%, however, the C.F.M. requirement is 595 C.F.M. This engine would, therefore, require a 600 C.F.M. carburetor.

NOTE: Supercharged engines generally require carburetors with 40% to 50% more C.F.M. than normally aspirated engines. Holley offers a new line of supercharger carburetors. These carbs are identified by this logo:

Holley
SUPERCHARGER
CARBURETORS

SELECTING A MECHANICAL SECONDARY CARBURETOR

For high performance engines a carburetor with mechanical secondaries has an inherent advantage over a carburetor with a "controlled" secondary system (air valve or vacuum diaphragm). This is possible because a controlled secondary carburetor, until it reaches wide open throttle, will not have as great a pressure drop below the throttle plates as would a mechanical secondary unit. The greater the pressure drop below the throttle plates the more dense will be the fuel/air charge to the engine and, hence, the more output.

Greater care, however, must be taken in selecting the correct size mechanical secondary carburetor for an application. Double pump, mechanical secondary carburetors initially depend only on the accelerator pumps to provide adequate fuel until enough air flow can be
established to begin pulling in the main system. The larger the carburetor the higher the air flow required to accomplish this. If the carburetor is too large, the pump shot will be consumed before the main system starts. The result is a "bog" or a "sag".

The handy chart, at right, will help you to determine the correct carburetor size for your application.

Carburetor Size Selector*

For Model 4150 Double-Pumpers, Model 4165 Spread-Bore, Model 4500 Dominator

More about using the chart – If your car has an automatic-transmission, make sure you know the converter stall speed before using the chart. If in doubt, use the figure shown for a typical Chevrolet converter (1350 RPM). If you are using a modified converter for a racing application, make sure the stall speed is what you think it is.

If your car has a manual transmission, use the lowest RPM at which you use wide-open throttle. This must be a very conservative RPM (on the low-RPM side, that is!) and should be found by observing your own driving habits in the vehicle involved. Watch your tachometer! The heavier the vehicle and the lower the numerical axle ratio (higher gear ratio) – the lower this RPM must be.

With engines from 300 to 400 CID, the right choice usually works out to be a 650 to 700 CFM carburetor. A light car, such as a Camaro, Mustang or Duster may be able to use a 700 or 750 CFM unit, especially with a high numerical gear ratio (low gear ratio). When in doubt, select a smaller carburetor size because it will typically give better acceleration times – even though power may fall off slightly at top RPM. You can believe that you'll be happier with the smaller carburetor nearly every time!

* From "Holley Carburetors & Manifolds" by Mike Urich and Bill Fisher

Airflow vs. Engine RPM

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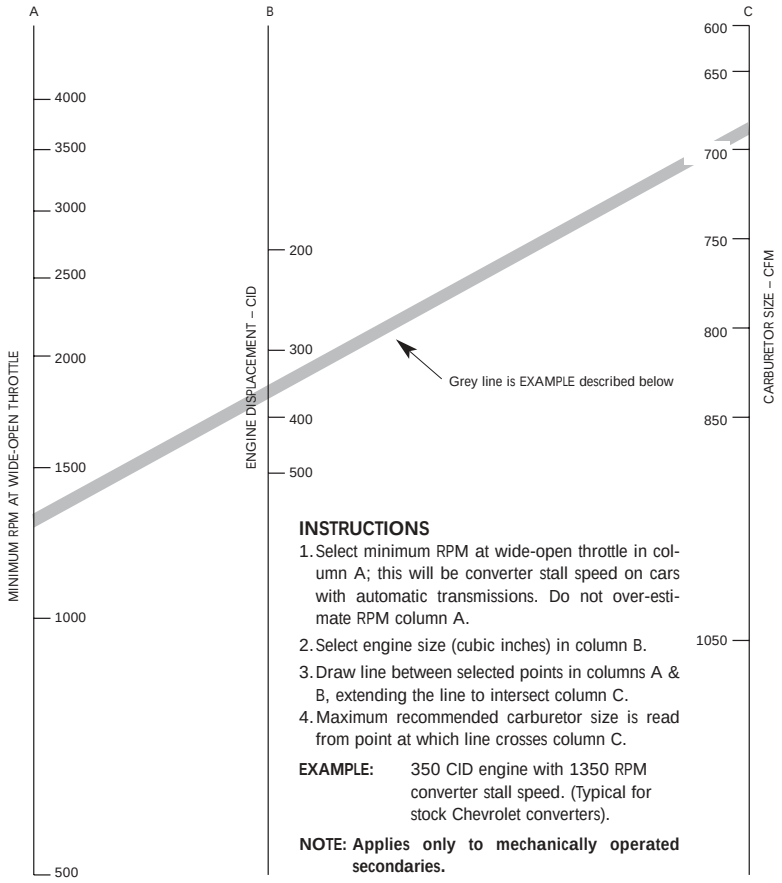

INSTRUCTIONS

1. Select minimum RPM at wide-open throttle in column A; this will be converter stall speed on cars with automatic transmissions. Do not over-estimate RPM column A.
2. Select engine size (cubic inches) in column B.
3. Draw line between selected points in columns A & B, extending the line to intersect column C.
4. Maximum recommended carburetor size is read from point at which line crosses column C.

EXAMPLE: 350 CID engine with 1350 RPM converter stall speed. (Typical for stock Chevrolet converters).

NOTE: Applies only to mechanically operated secondaries.