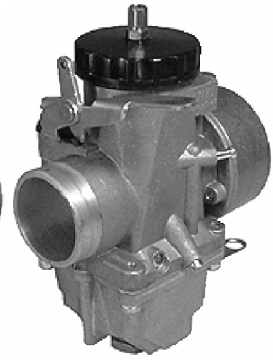
8 Carburation and Induction

Amal GP



Amal Mk2

Amal Mk1

Depending on what is expected of the engine, the choice of carburettor is enormous, from the Villiers 7/8" trials instrument right up to the 1.5" GP as used on the Starmaker 250 racer.

Club rules again play a part in the final selection of a suitable device that ensures correct carburation. For trials, small diameter S25 Villiers units on long induction pipes is favoured, but the draw back is that this unit does not have a throttle stop, (unlike the S25/7 carburettor from the minicar engines), adjustment being carried out on the operating cable, which alters when the handlebars are turned. This unit is often replaced by the Amal Monoblock. which was available in many sizes up to 1 3/16", and was the universal fitment to all scrambles engines.

The Amal Concentric Mk 1 increasingly replaces the Monoblock, though all carburettor spares are available, and is available in steps of 2 mm up to 38 mm. When changing to the Concentric the opportunity of going up one size or jetting to a leaner mixture can be taken as this instrument is a more efficient device. The Amal Mk2 is nice too, depending on your taste for original looks, and club competition rules for classic machines.

For most road oriented carbs, the fuel entry to the float chamber while good enough for a four strokes, is lacking when used with a well tuned two stroke. For the Monoblock this deficiency can be eradicated if the fuel passages in the banjo bolt are opened up, and a slot cut in the chamber wall, to allow fuel to enter it directly from the float valve, instead of going up and over the

top of the valve housing. The plastic float, which must be of the shallow type to give a better fuel reserve, should have the moulding flash removed. This will make it lighter and more responsive. The Amal Mk2 is available with larger fuel valves, and used with a Viton tipped float needle will control the fuel inputs better. At the Venturi end of the choke tube are the air bleed holes, the entrances of which are raised up. These humps create a disturbance to the air flow over the jet block, and should be smoothed out. Finally to improve snap acceleration, the spray tube needs to be chamfered away on the down stream side to improve the entry into the choke of the heavier petrol/oil mixture.

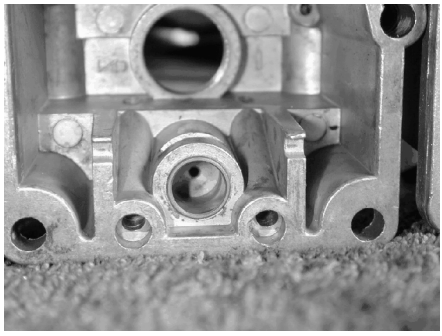


Figure 47 Mk2 Amal, small fuel valve

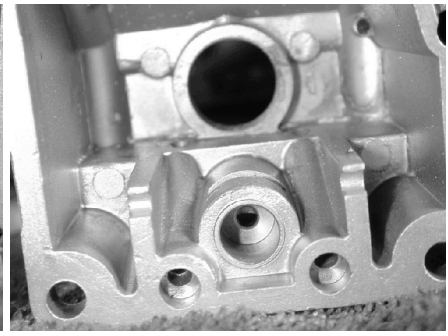


Figure 48 Mk2 Amal, large fuel valve

The photos above show Amal Mk2 float bowls with differing fuel valve apertures, below right the tipped and untipped valves, below left shows the large and small floats.

Figure 50 Mk2 Amal floats

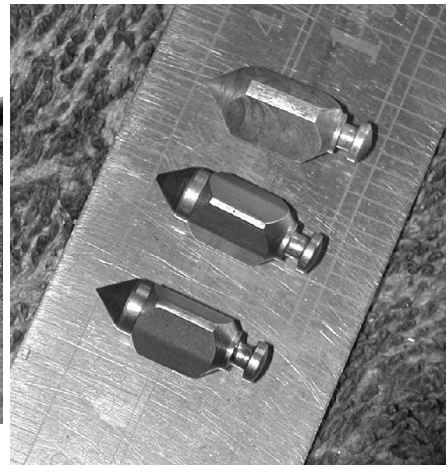


Figure 49 Mk2 Amal fuel valve needles

A carburettor is capable of passing vast amounts of mixture into the engine, as in the racing role, and must be fed at the same rate from the fuel tank. The standard single fuel tap is just not up to delivering this amount, and must be either opened up, or doubled up. When using methanol, the need

to feed the carburettor cannot be stressed enough, as any shortage could lead to a melted piston. On the older carburettors with detachable float chambers, the twin floats from an old speedway machine can be used to ensure an adequate flow. You are cautioned about using old car components without extensive modification, as these are designed to run with a fuel pump not gravity. See item later in this chapter on fuel flow.

As an extension to the Mk 1, AMAL produced the Mk 1½, which was a clip fitting instrument, that featured a superior plunger choke mechanism. Also available are various rubber mounting stubs of differing sizes and angles to mate up to the original Monoblock fitting. On the road race side the original instrument of the day was the Amal TT or RN which gave way to the GP, a standard fit to the Greeves Silverstones. Many organisations demand the fitment of one of these period units, VMCC amongst them, but the CRMC allow the use of the Amal Concentric Mk2 including the smooth bore (but not the power jet type) as a direct replacement, but the fitment puts the machine into the period 2 class. Period 1 machines have to use the original fitment carburettor. The CRMC acknowledge that spares for older carburettors are getting harder to find, and sanction the use of the Spanish built Amals, which can be obtained in 2 mm steps up to 40 mm. (Correct 2010)

Principles of operation

The carburettor is built around the Venturi principle, that a constriction in a pipe will locally increase the speed of the gas and decrease its pressure (Boyle's Law) and that the decrease in pressure can be used to suck fuel out of a jet located at the centre of the constriction. An uncompensated venturi will deliver an increasingly rich mixture as the air speed increases, so an air correction is required to compensate for this basic venturi behaviour. The reason for this behaviour is that fuel take up is proportional to air velocity through the throat of the carburettor but the actual mass of the air passing over the nozzle does not remain in proportion because the pressure drop in the venturi is accompanied by a reduction in air density.

The correction in its more primitive form is just an air hole in the needle jet, as in the Amal products of the 1950/60/70 period. The pressure drop causes the air flow in the correction system to increase more rapidly than the fuel flow, and to a large extent stabilises the mixture strength. There are better alternatives, such as drawing air into a perforated emulsion tube where the air and fuel mix prior to passing out through the spray nozzle, such as is found in Mikuni products. At small openings the emulsion tube is almost full of fuel and so air only mixes at the top. At wide throttle openings the fuel level drops and uncovers more holes so the air correction factor increases. A hole pattern of large holes at the top graduated to smaller holes at the bottom will generally give a rich mixture at higher rpm than small holes graduating to large holes. This is one reason why the Mikuni instrument is