

Tuning Webbers

3 Air corrector jet selection

The air corrector jet meters air to the emulsion tube and, due to the fact that air is less dense than fuel, the size of jet affects the higher engine speeds rather than the lower speeds. The air corrector jet also works in conjunction with the main fuel jet and both components are therefore calibrated together.

Air corrector jets sizes range from 0.70 mm to 3.40 mm and as a starting point a 2.00 mm size will be in order. On differential type carburettors, the 2.00 mm size air corrector jet should be fitted to the primary main circuit and, as a starting point, a 1.80 mm air corrector jet should be fitted to the secondary main circuit.

4 Main fuel jet selection

The main fuel jet meters fuel to the nozzle in the auxiliary venturi via the emulsion tube. Its size will depend on the requirements of the engine. As it works in direct relationship with the choke, the size of the main jet will vary in relation to the size of the choke. The graph shown in Fig. 5.3 will enable the main jet size to be chosen, although this graph assumes that the air corrector jet size is 2.00 mm.

The final size of main fuel jet and air corrector jet can be chosen after testing the carburettor.

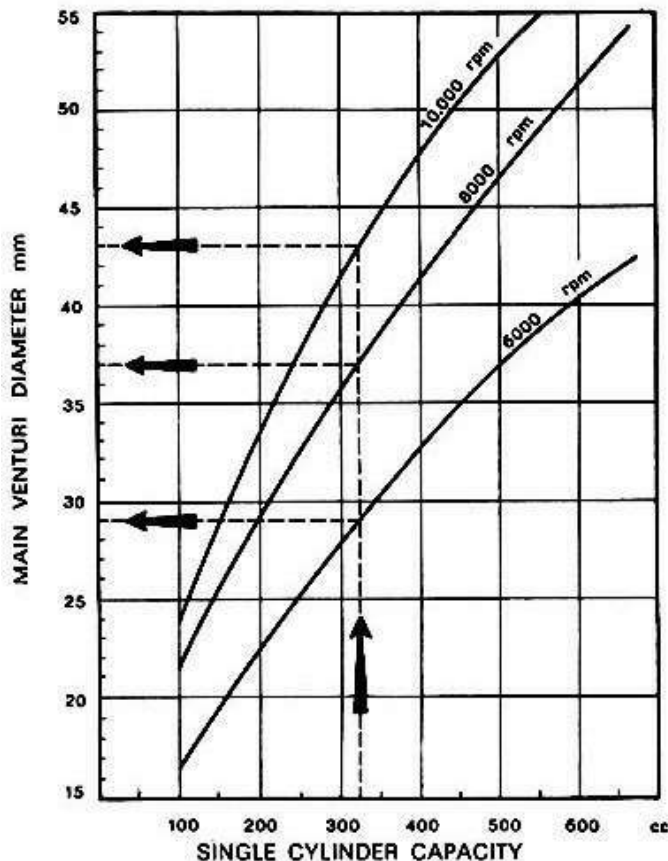


Fig. 5.2 Choke diameter selection chart (Sec 2)

For 4-stroke engines with one carburettor barrel per engine cylinder. The three curves correspond to maximum output engine speeds of 6000, 8000 and 10 000 rpm

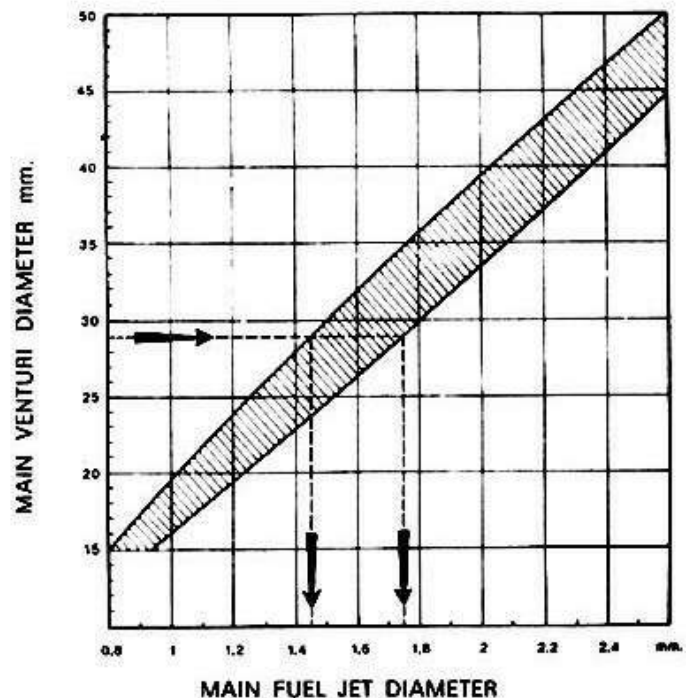


Fig. 5.3 Main fuel jet selection chart (Sec 4)

Showing air corrector jet at a constant 2.00 mm diameter with one choke (main venturi) feeding 4 or 6 cylinders. Where one choke feeds two cylinders, multiply the jet size by 0.90. Where one choke feeds a single cylinder, multiply the jet size by 0.75

The emulsion tube emulsifies air from the air corrector jet with fuel from the main fuel jet and therefore controls the mixture emanating from the nozzle at all engine speeds with the main circuit in operation.

The controlling factors of the emulsion tube are its diameter and the location of the emulsion holes. These factors are included in the code number of the emulsion tube which is always preceded by the letter F. Unfortunately the code numbers do not follow in any particular sequence which would indicate the applicable characteristics, but the following chart shows the emulsion tubes to be wired to correct mixture faults, together with the most common types:

Application

Most common type	
For low rpm enrichment or slight acceleration enrichment (emulsion holes towards the bottom)	
For low rpm weakening or slight acceleration weakening (emulsion holes towards the top)	
For high rpm weakening with air corrector jet larger than 2.0 mm (greater number of emulsion holes)	
For low rpm acceleration enrichment with larger air corrector jet (smaller diameter tube)	
For large main fuel jets or alcohol fuels	

IDF, DCOE, 48/48 IDA F16, F11, F7	Emulsion tube code number	
	28/36 DCD F30	Differential and triple choke F6
F7	F23, F30	F3, F5, F7, F21
F2, F3, F11, F14, F15, F16	F8, F26, F33	F20, F33, F34
F11, F19	F8, F9, F31	F8, F16, F20
F7, F8	F13	F3, F5, F25
F2, F3, F4, F7, F17	F8, F10, F29	F2, F20, F24, F25, F26

Note: Correction tables for DCFN emulsion tubes are not available, although the most common types are F36, F25 and F27

The operation of the emulsion tube is given in Part 2 of this Manual in the relevant carburettor Chapter. It will be observed that where the emulsion holes are located on the upper section of the tube, the emulsifying action will begin at lower engine speeds. Where the holes are towards the lower section of the tube, the action will begin at higher engine speeds. The diameter of the emulsion tube determines the reserve of fuel in the emulsion tube well; a thin tube will give a large reserve and vice versa. This reserve of fuel has a great effect on the acceleration of the engine and is therefore an important factor.

Due to the number of emulsion tubes available, it is recommended that the advice of a Weber dealer is sought, particularly if there is more than one carburettor, as a wrong choice could prove very expensive. However, in the absence of any information, the most common emulsion tube sizes given in the chart should be used initially.

6 Idling jet selection

The idling jet meters fuel to the idling and progression circuits and, as this circuit is generally used for a large percentage of driving, this size of jet is quite critical both in the interests of economy and engine flexibility.

On DCOE and 48/48 IDA carburettors, the idling jet holders incorporate calibrated air correction holes coded from Rich to Lean in the following sequence:

F6, F12, F9, F8, F11, F13, F2, F4, F5, F7, F1, F3

In carburettor types other than the above, air correction for idling and progression is provided through fixed calibrated holes and these cannot be altered.

Since the choice of idling jet determines the lower to middle engine speed range drivability to a large extent, the final size will be decided during the calibration of the carburettor. However, as a starting point, a 0.50 mm size fuel jet should be fitted.

7 Needle valve selection

The needle valve is operated by the float and admits fuel to the float chamber. The size of the needle valve seat aperture must be sufficient to pass fuel continuously at a rate which the engine requires when it is at maximum power. The size is

therefore dependent on the maximum power of the particular engine.

It is recommended that the minimum size needle valve consistent with the maximum engine power is fitted, since the level of fuel in the float chamber is more accurately controlled with smaller sizes.

The following chart indicates the needle valve sizes where one needle valve is fitted; where there is more than one needle valve (ie on triple choke carburettors or multiple carburettor fittings) the maximum hp for the engine should be divided by the number of needle valves to calculate the size for each valve:

hp	mm
Up to 60	1.50
61 to 110	1.75
111 to 150	2.00
151 to 180	2.25
181 to 200	2.50
Over 200	3.00
Alcohol application	3.00

8 Calibrating the DCOE carburettor

Having selected and fitted the various jets, chokes, etc as previously described, the time has now come to test the engine for performance and to make any final adjustments as necessary.

1 Start the engine and run it until normal operating temperature has been reached, then adjust the slow running as described in Part 2 of this Manual, Chapter 11. Take care not to set the idle speed screw too far in, otherwise the first progression holes may be uncovered. For this reason the idle screw should be adjusted to give the minimum possible idling speed.

2 As a preliminary check as to whether the idling jet is of the correct size, note the position of the mixture adjustment screw, then screw it in as far as possible then right out. If the idling jet is of the correct size, the idling position of the mixture screw should be approximately midway between fully in and fully out. If the mixture screw needs to be nearly screwed right in, the idling jet is too rich and vice versa. Reset the mixture screw before proceeding.

3 Turn the idling speed adjusting screw to increase the engine speed and at the same time, look through the auxiliary venturis using a torch and mirror if necessary. As soon as mixture starts

EMULSION TUBE ACTION

The controlling factors of the emulsion tube are its diameter and the number, size and location of the holes.

Air is admitted through the air correction jet which screws in on top of the tube or may be pushed into the tube. Air coming through the correction jet flows out through the holes drilled in the tube and mixes with the fuel in the emulsion tube well.

The fuel in the emulsion tube will come through the main jet which may be screwed into the carburetor body or pushed into the bottom of the tube and seats against the bottom of the well. From inside the tube, fuel passes into the well through holes drilled in the tube and mixes with air towards the top of the tube before travelling to the outlet from the auxiliary venturi.

At idle or low speed, low load engine conditions, the level of fuel in the well would equal that in the float chamber. This reserve of fuel helps to enrich the mixture as engine speed or load increases. Two factors, therefore, become evident:

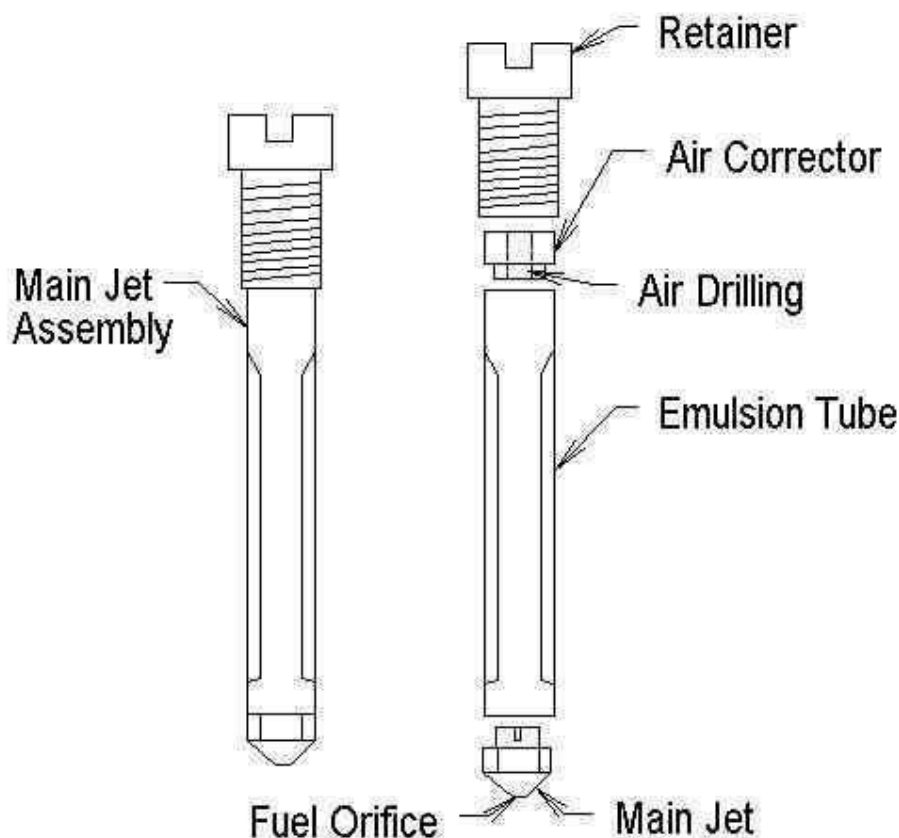
Firstly, a thin emulsion tube will leave room in the well for a larger reserve of fuel and conversely, a thick tube will lessen the reserve.

Secondly, the initial draw of mixture from the well as the throttle is opened will be richer if there are no holes in the upper part of the tube, holes in the upper section of the tube will admit air and weaken the mixture.

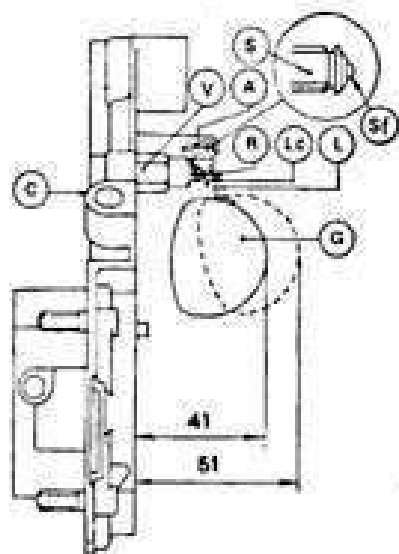
To cite the two extremes — a thin tube without upper holes — rich. A thick tube with large upper holes — weak.

The foregoing action will only occur during initial acceleration, as once the reserve in the well has been used, the main jet is the only supply in this particular circuit. Changing the emulsion tube is preferable to richening the pump jet to overcome an initial hesitation. The effect of an over-rich pump jet is disguised at higher engine speeds but it has a large bearing on economy.

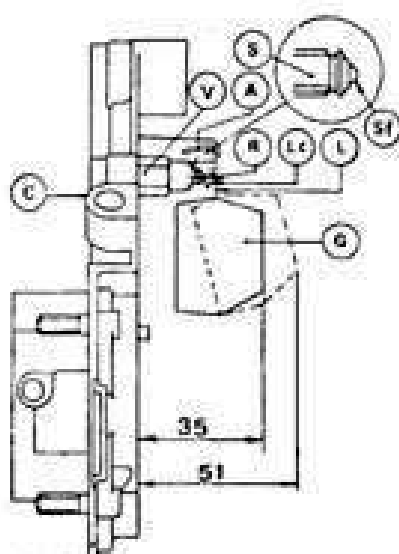
This is particularly evident in the DCOE series where the pump circuit becomes a power circuit under full load conditions.



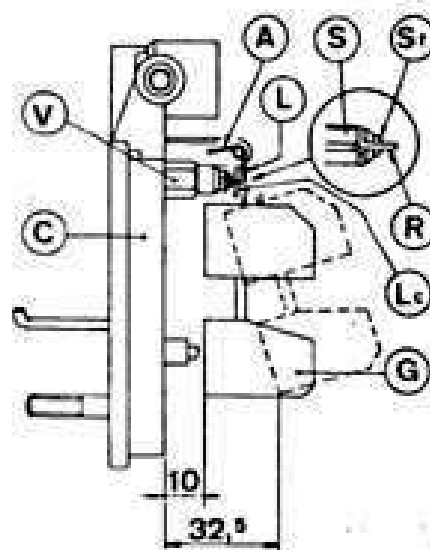
DGV Series
w/Brass Float



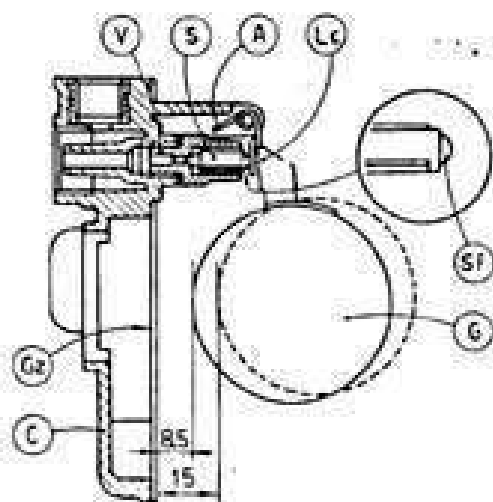
DGV Series
w/Plastic Float



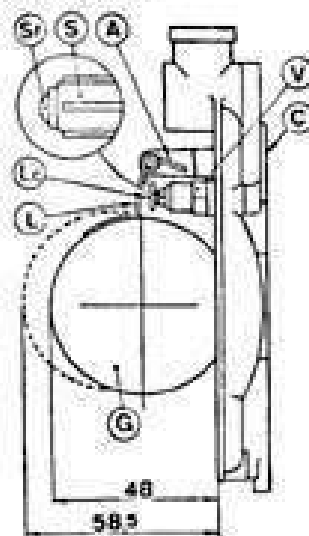
IDF Series



DCOE Series
(measure w/gasket in place)



DCNF Series



• **Jetting for a modified 2000 engine (45mm WeberDCOEs)**

38mm chokes.

145 main jets.

180 air correctors.

F16 emulsion tubes.

40 accelerator pumps.

45 F2 idle jets

4.5 auxiliary venturis.

Float level shut height - 7.5mm.

Float height at full droop - 15mm.

Idle screws turned out one full turn.

50 accelerator pump inlet.

Example engine had 18 degrees of advance at an idle speed of 1200rpm and 38 degrees of total mechanical advance. No vacuum advance was fitted (removed from the distributor) and the economy was down because of it.

The carburetor internals fitted to this engine are :-

38mm chokes,

No. 4.5 Auxiliary venturies

No. 2 Needle valves

No. 40 accelerator pump jets

RM OLD JETS

No. 50 F9 idle jets

No. F2 Emulsion tubes

No. 150 Main jets

No. 195 Air jets

4.5 venturi's

42mm chokes

250 needle and seats(it also made no difference running 200's either)

45 pump jets

60F9 idle jets

F16 emulsion tubes

155 mains (summer) & 165 mains (winter)

145 air correctors (summer) & 140 (winter)