In a case where too small a main jet has been fitted at first, and the running with the choke on makes a noticeable improvement, you should increase the main jet size until the conditions mentioned above occur.

In selecting the correct main jet, the engine running temperature should be taken into consideration, quite apart from increases in power and top speed, because lean mixtures cause higher running temperatures.

In a situation where a very large increase in the main jet size is required, remember that the main jet flow cross-sectional area should not exceed the effective area for fuel flow between the needlejet and the tapered-needle tip.

Check this with the following formula:

$$\left[\left(\frac{Dm}{2}\right)^2 \cdot 3{,}14\right] < \left[\left(\frac{Dp}{2}\right)^2 \cdot 3{,}14 - \left(\frac{Ds}{2}\right)^2 \cdot 3{,}14\right]$$

where

Dm is the main jet size
Dp is the atomiser-needlejet size
Ds is the tapered needle tip diameter
All measured in hundredths of a millimeter

For example: main jet 180
needlejet 264
tapered needle tip 170:

$$\left[\left(\frac{180}{2}\right)^2 \cdot 3{,}14\right] < \left[\left(\frac{264}{2}\right)^2 \cdot 3{,}14 - \left(\frac{170}{2}\right)^2 3{,}14\right]$$

$$[90^2 \cdot 3{,}14] \quad [132^2 \cdot 3{,}14 - 85^2 \cdot 3{,}14]$$

$$[8100 \cdot 3{,}14] \quad [17420 \quad 3{,}14 \quad 7220 \cdot 3{,}14]$$

$$25.430 < 54.700 - 22.670$$

giving the result 25.430 < 32.030 ie. the needle-needlejet clearance is adequate here.

3.7 Acceleration

Every time the throttle is opened suddenly, the air speed in the barrel drops.

In two-stroke engines this does not upset good engine running, but in four-stroke engines this drop in air speed causes the atomiser to deliver insufficient fuel.

For this reason, on large-diameter carburettors for four-stroke engines, an accelerator pump enrichment device is fitted.