5. — FACTORS WHICH CAN AFFECT CARBURATION

In some cases, carburation which has been properly set up in particular conditions can then be upset by certain factors ie.

a change of fuel used
a change in atmospheric pressure
a change in air temperature

5.1 — Change of fuel

When a different fuel other than commercial petrol is used, it is necessary to estimate theoretically the new stoiciometric mixture ratio and consequently change all the jet sizes to suit.

If the stoiciometric mixture ratio decreases, larger jets are required and vice versa. Any such changes should, of course, be made on a percentage basis ie. when the stoiciometric ratio increases by a certain percentage, the jet sizes should be reduced by that percentage.

For example, if commercial petrol (stoiciometric ratio 14.5) is replaced by methyl alcohol (methanol, with chemical formula CH30H - stoiciometric ratio 6.5) the jet sizes should be increased by about 50% ie. double the flow rate. If fuel consisting of 25% petrol and 75% methanol is used, jet sizes should all be increased by 30%; with fuel composed of 50% petrol and 50% methanol, the jet sizes need only be increased by 18% compared to when using straight petrol.

You should also replace the needlevalves, increasing the seat sizes accordingly.

When using special fuels such as methanol, it is very important that all the component materials of the carburettors have been treated, wherever necessary, to resist chemical attack. For example, nylon components should be removed, and replaced by other parts resistant to the new fuel.

5.2 — Changes in atmospheric pressure and in air temperature

Variations in pressure or temperature cause a change in the air density and consequently a change in the fuel-air ratio and further tuning may therefore become necessary.

A decrease in atmospheric pressure with consequent decrease in air density causes a mixture enrichment and smaller jets will therefore be required.

Altitude variations also produce changes in the carburation and they too cause changes in the air density; prolonged use of a vehicle at an altitude higher than 1500 metres, the carburation of which was originally set up for operation at around sea level, would require a change of jet sizes in proportion to the pressure change.

In this case too, a decrease in pressure should be compensated by a reduction of the jet sizes.

Furthermore, a lowering of air temperature produces an increase in air density and consequently a mixture weakening; therefore an increase in the jet sizes is required.

Summarising, we can say that any decrease in air pressure, any increase in altitude or in air temperature should be compensated for by a decrease in the jet sizes.

Conversely, any increase in pressure or any decrease in altitude or in temperature should be compensated by an increase in the jet sizes.