

## S.U. Carburettor Needles and How to Select the Ideal Profile

Extracted from "Tuning S.U. Carburettors" by Speed and Sports Publications, London, 1970, and contributed by John Fowler

The S.U. Carburettor Co. Ltd. Book of Needle Sizes gives a list of Diameters for each needle starting with the diameter immediately under the shank or head of the needle and working down the length in increments of one eighth of an inch. The smaller the diameter at any particular point the richer the needle will be at that point.

To illustrate what the needle dimensions in the book actually represent we will take an example, the CE, (a diagram of this needle appears on the following page), and list the dimensions and discuss which part affects which driving condition.

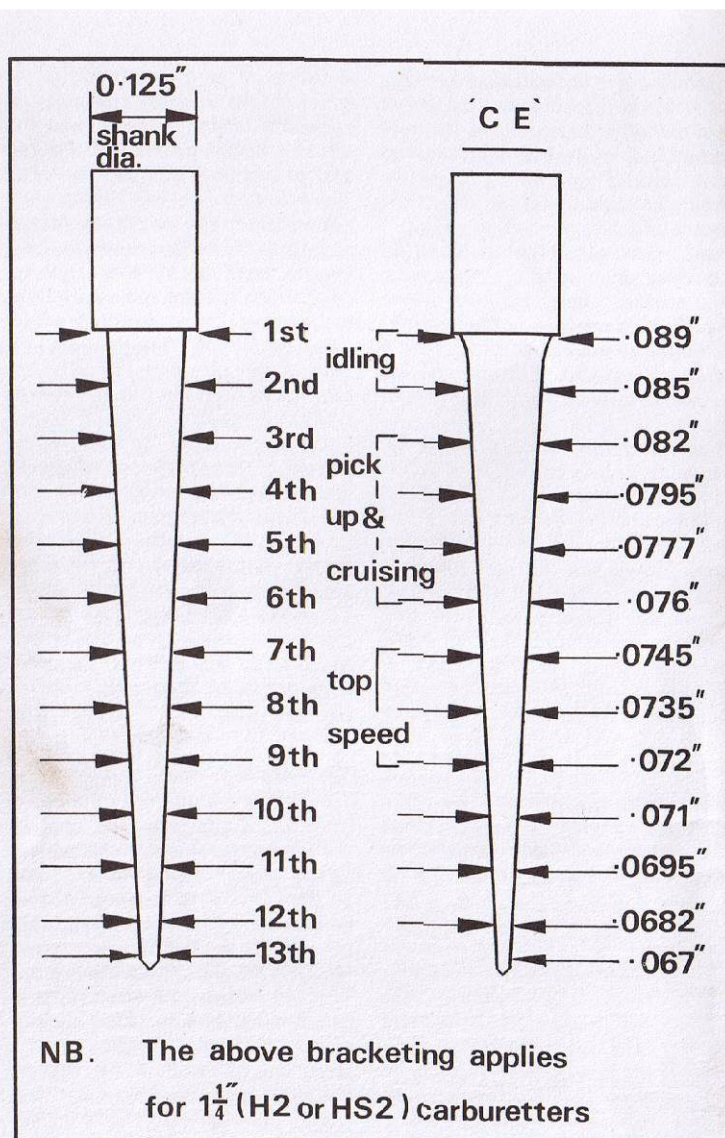
Referring to diagram (1) the first two dimensions are given as 1). .089 and 2). .085: these are the idling or datum positions and it is advisable when changing from one needle to another to choose one with the same idling dimensions.

If this is not possible then bear in mind that if the new needle has weaker or larger idling dimensions (say: .089 —.0855) the rest of the needle will give slightly richer results than suggested by the dimensions.

If the idling dimensions are richer or smaller (say: .089....0845) the needle will give slightly weaker results than one would expect. This is due to the alteration in the jet position required by the new idling dimensions.

The next four dimensions govern the pick up in top gear from about 20 m.p.h. to 50 m.p.h. These are 3) .082 4) .0795 5) .0777 6) .076 and are also the part of the needle which meters fuel for the part throttle or cruising conditions. A cruising speed of 30 m.p.h. will lie approximately (depending on size of carburettor) between the second and third dimensions on the diagram; a steady 50 m.p.h. will occur around the fifth portion.

Dimensions from the seventh (.0745) to the ninth (.072) affect the top end full throttle conditions. The last three dimensions (with 1.25" diameter carburettors) do not take part in the metering.



### **Testing procedure**

With the carburettor(s) correctly set for mixture at idle conditions (see S.U. Service Literature) and the engine oil and water at normal temperatures, carry out a number of acceleration tests and part throttle tests.

First accelerate from about 20 m.p.h. in top gear to about 50 m.p.h. If there is hesitation or a pulling back, repeat test with the choke pulled out about 5/8". If there is an improvement, make a note that the third, fourth and fifth, and possibly the sixth needle dimensions require to be a little richer.

Now try driving at a steady 30, 40 and 50 m.p.h.; if there is a slight see-sawing action, try to cure this by slightly making richer the mixture control.

If weakness is suspected at these cruising speeds then again the third, fourth and fifth dimensions will also require a richer mixture. A similar test can be carried out for high speed in top gear. Here it is very important to ensure that there is no weakness.

When an engine is modified, an alternative more suitable SU Needle will have to be selected from the SU Needle Charts, where a variety of differing needle profiles can be found.

#### N.B.

If the mixture is **Too Weak**, the exhaust will have an irregular note, a 'splashy' misfire.

If the mixture is **Correct**, the exhaust will have a regular and even note.

If the mixture is **Too Rich**, the exhaust will have a regular or rhythmical misfire and will emit a 'blackish' smoke.