Chapter 9

TYPE II TEST ON SI ENGINES

(VERIFYING CARBON MONOXIDE, HYDROCARBONS EMISSION AT IDLING)

1 Scope:

This Chapter describes the procedure for the Type II test for verifying carbon monoxide, Hydrocarbons emission at idling of spark ignition engine vehicles, as defined in Para 5.2.3 of Chapter 1 of this Part.

2 Condition of Measurement

2.1 The fuel shall be the reference fuel, specifications for which are given applicable Gazette Notification under CMVR for which vehicle is subjected to test.

2.2 During the test, the environmental temperature must be between 293 and 303 K (20 and 30 degrees C).
The engine shall be warmed up until all temperatures of cooling and lubrication means and the pressure of lubrication means have reached equilibrium.

2.2.1 Vehicles that are fuelled either with petrol or with LPG or NG shall be tested with the reference fuel(s) used for the type I test.

2.3 In the case of vehicle with manually operated or semi-automatic-shift gearboxes the test must be carried out with the gear lever in the 'neutral' position and with the engaged.

2.4 In the case of vehicle with automatic gear-boxes the test is carried out with the gear selector in either the 'neutral' of the 'parking' position.

2.5 Components for adjusting the idling speed.

2.5.1 Definition
For the purposes of this Part, 'components for adjusting the idling speed' means controls for changing the idling conditions of the engine which may be easily by a mechanic using only the tools described in 2.5.1.1. In particular, devices for calibrating fuel and air flows are not considered as adjustment components if their setting requires the removal of the set-stops, an operation which cannot normally be performed except by a professional mechanic.

2.5.1.1 Tools which may be used to control components for adjusting the idling speed: screwdrivers (ordinary or cross-headed), spanners (ring, open-end of adjustable), pliers, Allen keys.

2.5.2 Determination of measurement points

2.5.2.1 A measurement at the setting in accordance with the conditions fixed by the manufacturer is performed first.

2.5.2.2 For each adjustment component with a continuous variation, a sufficient number of characteristic positions are determined.

2.5.2.3 The measurement of the carbon-monoxide content of exhaust gases must be carried out for all the possible position of the adjustment components, but for components with a continuous variation only the positions defined in 2.5.2.2 are adopted.

2.5.2.4 The Type II test is considered satisfactory if at least one of the two following conditions is met:

2.5.2.4.1 none of the values measured in accordance with 2.5.2.3 exceeds the limit values;

2.5.2.4.2 the maximum content obtained by continuously varying one of the adjustment components while the other components are kept stable does not exceed the limit value, this condition being met for the various combinations of adjustment components other than the one which was varied continuously.

2.5.2.5 The possible positions of the adjustment components are limited:

2.5.2.5.1 on the one hand, by the larger of the following two values: the lowest idling speed which the engine can reach; the speed recommended by the manufacturer, minus 100 revolutions per minute;

2.5.2.5.2 on the other hand, by the smallest of the following three values: the highest speed the engine can attain by activation of the idling speed components; the speed recommended by the manufacturer, plus 250 revolutions per minute; the cut-in speed of automatic clutches.

2.5.2.6 In addition, settings incompatible with correct running of the engine must not be adopted as measurement settings. In particular, when the engine is equipped with several carburetors all carburetors must have the same setting.

3 Sampling of Gases

3.1 The value of CO, HC concentration reading shall be recorded.

3.2 The sampling probe is placed in the pipe connecting the exhaust with the sampling bag and as close as possible to exhaust.

3.3 The concentration in CO (Cco) and CO2 (Cco_2) is determined from the measuring instrument readings or recordings, by use of appropriate calibration curves.

3.4 The corrected concentration for carbon monoxide regarding four-stroke engine is:

$$C_{co}corr = C_{co} \frac{15}{C_{CO} + C_{CO_2}} \text{ (vol.\%)}$$

3.5 The concentration in Cco (see 3.2) measured according to the formulae contained in 3.3 need not be corrected if the total of the concentrations measured (Cco + Cco_2) is at least 15 for four stroke engines.