

CHAPTER 12

TYPE V TEST: DESCRIPTION OF THE AGEING TEST FOR VERIFYING THE DURABILITY OF ANTI POLLUTION DEVICES FROM 4 WHEELERS

1. INTRODUCTION

This Section described the test for verifying the durability of anti-pollution devices equipping vehicles with positive-ignition or compression-ignition engines during an ageing test of 80,000 km.

2 TEST VEHICLE

2.1 The vehicle must be in good mechanical order, the engines and the anti-pollution devices must be new. The vehicle may be the same as that presented for type I test; this type I test has to be done after the vehicle has run at least 3000 km of the ageing cycle of clause 5.1.

3 FUEL

The durability test is conducted with commercially available unleaded petrol or diesel fuel.

4 VEHICLE MAINTENANCE AND ADJUSTMENTS

Maintenance, adjustments as well as the use of the test vehicle's controls shall be those recommended by the manufacturer.

5 VEHICLE OPERATION ON TRACK, ROAD OR ON CHASSIS DYNAMOMETER

5.1 Operating cycle

During operation on track, road or on roller test bench, the distance must be covered according to the driving schedule (Figure 1 below) described below:

- the durability test schedule is composed of 11 cycles covering 6 kilometers each,
- during the first nine cycles, the vehicle is stopped four times in the middle of the cycle, with the engine idling each time for 15 seconds,
- normal acceleration and deceleration,
- five decelerations in the middle of each cycle, dropping from cycle speed to 32 km/h and the vehicle is gradually accelerated again until cycle speed is attained,
- the 10th cycle is carried out at a steady speed of 72 km/h,

- the 11th cycle begins with maximum acceleration from top point up to 90 km/h. at half-way, braking is employed normally until the vehicle comes to a stop. This is followed by an idle period of 15 seconds and a second maximum acceleration.

The schedule is then restarted from the beginning. The maximum speed of each cycle is given in the following Table.

Figure 1: a. Maximum speed of each cycle

Cycle	Cycle speed in km/h
1	64
2	48
3	64
4	64
5	56
6	48
7	56
8	72
9	56
10	72
11	90

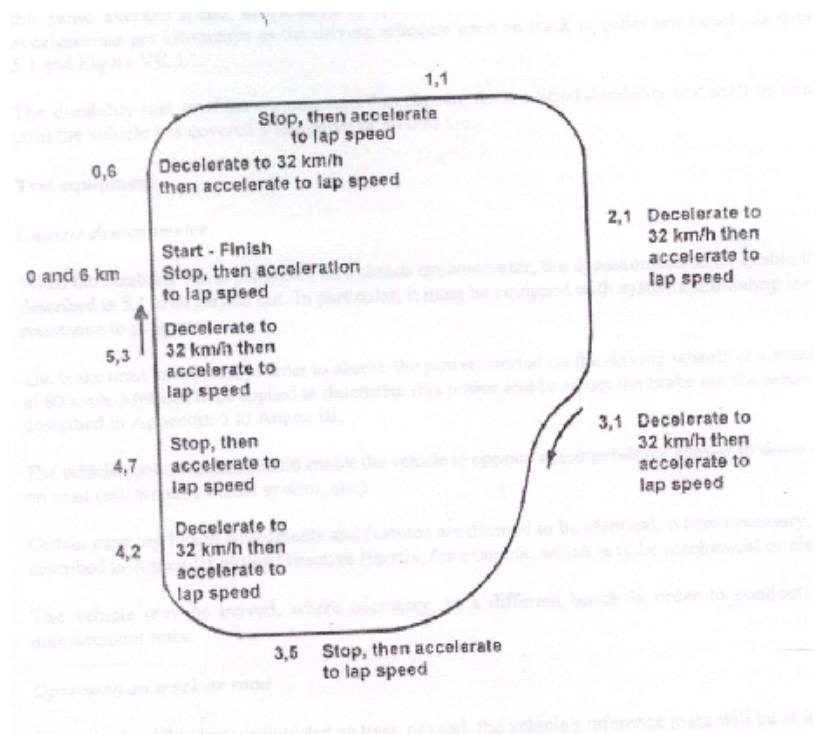


Figure 1: b. Driving Schedule

5.1.1 At the request of the manufacturer, an alternative road test schedule may be used. Such alternative schedules shall be approved by the technical service in advance of the test and must have substantially the same average speed, distribution of speeds, number of stops per kilometers and number of accelerations per kilometers as the driving schedules used on track or roller test bench, as detailed in 5.1 and Figure 1 above.

5.1.2 The durability test, or if the manufacturer has chosen, the modified durability test shall be conducted until the vehicle has covered a minimum of 80,000 km.

5.2 Test equipment

5.2.1 Chassis dynamometer

5.2.1.1 When the durability test is performed on a chassis dynamometer, the dynamometer must enable the cycle described in 5.1 to be carried out. In particular, it must be equipped with systems simulating inertia and resistance to progress.

5.2.1.2 The brake must be adjusted in order to absorb the power exerted on the driving wheels at a steady speed of 80 km/h. Methods to be applied to determine this power and to adjust the brake are the same as those described in Chapter 4.

5.2.1.3 The vehicle cooling system should enable the vehicle to operate at temperatures similar to those obtained on road (oil, water, exhaust system, etc.)

5.2.1.4 Certain other test branch adjustments and features are deemed to be identical, where necessary, to those described in Chapter 3 of this part (inertia, for example, which may be mechanical or electronic).

5.2.1.5 The vehicle may be moved, where necessary, to a different bench in order to conduct emission measurement tests.

5.2.2 Operation on track or road

When the durability test is completed on track or road, the vehicle's reference mass will be at least equal to that retained for tests conducted on a chassis dynamometer.

6 MEASURING EMISSION OF POLLUTANTS

At the start of the test (0 km), and every 10,000 km (+/- 400 km) or more frequently, at regular intervals until having covered 80,000 km, tailpipe emissions are measured in accordance with the type I test as defined in Chapter 1, clause 5.3.1. The limit values to be complied with are those laid down in applicable

Notification. However, the tailpipe emissions may also be measured in accordance with the provisions of Chapter 1, Clause 8.2.

All exhaust emissions results must be plotted as a function of the running distance on the system rounded to the nearest kilometer and the best fit straight line fitted by the method of least squares shall be drawn through all these data points. This calculation shall not take into account the test results at 0 km.

The data will be acceptable for use in the calculation of the deterioration factor only if the interpolated 6,400 km and 80,000 km points on this line are within the above mentioned limits. The data are still acceptable when a best-fit straight line crosses an applicable limit with a negative slope (the 6,400 km interpolated point is higher than the 80,000 km interpolated point) but the 80,000 km actual data point is below the limit.

A multiplicative exhaust emission deterioration factor shall be calculated for each pollutant as follows:

$$D. E. F. = \frac{Mi_2}{Mi_1}$$

Where,

Mi_1 = Mass emission of the pollutant I in grams per km interpolated to 6,400 km

Mi_2 = mass emission of the pollutant in grams per km interpolated to 80,000 km

These interpolated values must be carried out to a minimum of four places to the right of the decimal point before dividing one by the other to determine the deterioration factor. The result must be rounded to three places to the right of the decimal point.

If a deterioration factor is less than one, it is deemed to be equal to one.