Council Directive of 20 March 1970 on the approximation of the laws of the Member States on measures to be taken against air pollution by emissions from motor vehicles (70/220/EEC) (repealed)

[F1ANNEX [F2VIII]]

Description of the ageing test for verifying the durability of anti-pollution devices

Textual Amendments

F1 Substituted by Council Directive of 26 June 1991 amending Directive 70/220/EEC on the approximation of the laws of the Member States relating to measures to be taken against air pollution by emissions from motor vehicles (91/441/EEC).

F2 Substituted by Directive 98/69/EC of the European Parliament and of the Council of 13 October 1998 relating to measures to be taken against air pollution by emissions from motor vehicles and amending Council Directive 70/220/EEC.

1. INTRODUCTION

This Annex 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 engine and the anti-pollution devices must be new.

The vehicle may be the same as that presented for the type I test; this type I test has to be done after the vehicle has run at least 3 000 km of the ageing cycle of section 5.1.

[F3 3. FUEL

The durability test is conducted with a suitable commercially available fuel.]

Textual Amendments

F3 Substituted by Commission Directive 98/77/EC of 2 October 1998 adapting to technical progress Council Directive 70/220/EEC on the approximation of the laws of the Member States relating to measures to be taken against air pollution by emissions from motor vehicles (Text with EEA relevance).

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 [F2VIII].5.1) described below:

— the durability test schedule is composed of 11 cycles covering 6 kilometres 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 89 km/h,

— the 11th cycle begins with maximum acceleration from stop point up to 113 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.

TABLE **[**[F2]VIII**]**.5.1.

Maximum speed of each cycle

Cycle	**Cycle speedin km/h**
1	64
2	48
3	64
4	64
5	56
6	48
7	56
8	72
9	56
10	89
11	113

Figure **[**[F2]VIII**]**.5.1

Driving schedule

5.1.1. At the request of the manufacturer, an alternative road test schedule may be used. Such alternative test schedules shall be approved by the technical service in advance of the test and must have substancially the same average speed, distribution of speeds, number of stops per kilometres and number of accelerations per kilometres as the driving schedule used on track or roller test bench, as detailed in 5.1 and Figure **[**[F2]VIII**]**.5.1.

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 Appendix 3 to Annex III.

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 bench adjustments and features are deemed to be identical, where necessary, to those described in Annex III of this Directive (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 EMISSIONS OF POLLUTANTS

[[F2]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 section 5.3.1 of Annex I. The limit values to be complied with are those laid down in section 5.3.1.4 of Annex I.**]**

All exhaust emissions results must be plotted as a function of the running distance on the system rounded to the nearest kilometre 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 i 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.**]**