

## COMMISSION DIRECTIVE 96/44/EC

of 1 July 1996

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)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Council Directive 70/220/EEC of 20 March 1970 on the approximation of the laws of the Member States relating to measures to be taken against air pollution by emissions from motor vehicles<sup>(1)</sup>, as last amended by Directive 94/12/EC<sup>(2)</sup>, and in particular Article 5 thereof,

Whereas Council Directive 70/220/EEC is one of the separate directives of the EEC type-approval procedure which has been established by Council Directive 70/156/EEC<sup>(3)</sup>, as last amended by Commission Directive 95/54/EC<sup>(4)</sup>; whereas, consequently, the provisions laid down in Directive 70/156/EEC relating to the vehicle systems, components and separate technical units apply to this Directive;

Whereas Directive 70/220/EEC lays down the specifications for the testing of the emissions of the motor vehicles covered by its scope, whereas, in view of the experience gained and the state of the art of the laboratory techniques it appears appropriate to adapt these specifications accordingly;

Whereas it is equally appropriate to align the test conditions of Directive 70/220/EEC with those of Council Directive 80/1268/EEC of 16 December 1980 on the approximation of the laws of the Member States relating to the emissions of carbon dioxide and the fuel consumption of motor vehicles<sup>(5)</sup>, as last amended by Commission Directive 93/116/EC<sup>(6)</sup>, in particular as far as the relationship between the reference mass of the vehicle and the equivalent inertia which is to be used, is concerned;

Whereas this Directive shall bring the provisions of the use of the equivalent inertia of Directive 70/220/EEC into accordance with the provisions of Directive 80/1268/EEC and the wording of the information document and the type-approval certificate of Directive 70/220/EEC into accordance with the wording of Directive 70/156/EEC;

Whereas these amendments relate only to the administrative provisions and the techniques of emissions measurement contained in the Directive; whereas it is not necessary therefore to invalidate existing approvals to the Directive nor to prevent the registration, sale and entry into service of new vehicles covered by such approvals;

Whereas the measures provided for in this Directive are in accordance with the opinion of the Committee for Adaptation to Technical Progress established by Directive 70/156/EEC,

HAS ADOPTED THIS DIRECTIVE:

*Article 1*

The Annexes to Directive 70/220/EEC are amended in accordance with the Annex to this Directive.

*Article 2*

With effect from 1 January 1997, Member States may no longer grant:

- EEC type-approval pursuant to Article 4 (1) of Directive 70/156/EEC, or
- national type-approval, unless the provisions of Article 8 (2) of Directive 70/156/EEC are invoked,

for a new type of vehicle on grounds relating to air pollution by emissions if it fails to comply with the provisions of Directive 70/220/EEC.

This Directive will not invalidate any approval previously granted under Directive 70/220/EEC, nor prevent extension of such approvals under the terms of the Directive under which they were originally granted.

*Article 3*

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 31 December 1996. They shall forthwith inform the Commission thereof.

When Member States adopt these provisions, they shall contain a reference to this Directive or shall be accompanied by such reference on the occasion of their official publication. The procedure for such reference shall be adopted by the Member States.

<sup>(1)</sup> OJ No L 76, 6. 4. 1970, p. 1.

<sup>(2)</sup> OJ No L 100, 19. 4. 1994, p. 42.

<sup>(3)</sup> OJ No L 42, 23. 2. 1970, p. 1.

<sup>(4)</sup> OJ No L 266, 8. 11. 1995, p. 1.

<sup>(5)</sup> OJ No L 375, 31. 12. 1980, p. 36.

<sup>(6)</sup> OJ No L 329, 30. 12. 1993, p. 39.

2. Member States shall communicate to the Commission the texts of the main procedure of the national law that they adopt in the field governed by this Directive.

*Article 4*

This Directive shall enter into force on the 20th day following its publication in the *Official Journal of the European Communities*.

*Article 5*

This Directive is addressed to the Member States.

Done at Brussels, 1 July 1996.

*For the Commission*

Martin BANGEMANN

*Member of the Commission*

## ANNEX

## AMENDMENTS TO THE ANNEXES TO DIRECTIVE 70/220/EEC

1. A list of annexes is inserted between the Articles and Annex I to read as follows:

## 'LIST OF ANNEXES

- ANNEX I: Scope, definitions, application for EEC type-approval, granting of EEC type-approval, requirements and tests, modifications of the type, conformity of production, transitional provisions
- ANNEX II: Information document  
*Appendix:* Information on test conditions
- ANNEX III: Type I test (verifying the average emission of tailpipe emissions after a cold start)  
*Appendix 1:* Operating cycle used for the type I test  
*Appendix 2:* Chassis dynamometer  
*Appendix 3:* Measurement method on the road-simulation on a chassis dynamometer  
*Appendix 4:* Verification of inertias other than mechanical  
*Appendix 5:* Description of tailpipe emission-sampling systems  
*Appendix 6:* Method of calibrating the equipment  
*Appendix 7:* Total system verification  
*Appendix 8:* Calculation of the emission of pollutants
- ANNEX IV: Type II test (carbon monoxide emission test at idling speed)
- ANNEX V: Type III test (verifying emissions of crankcase gases)
- ANNEX VI: Type IV test (determination of evaporative emissions from vehicles with spark-ignition engines)  
*Appendix:* Calibration of equipment for evaporative emission testing
- ANNEX VII: Type V test (ageing test for verifying the durability of anti-pollution devices)
- ANNEX VIII: Specifications and reference fuels
- ANNEX IX: EEC type-approval certificate  
*Appendix:* Addendum'.

*Annex I:*

2. The headline of Annex I reads as follows:

**'Scope, definitions, application for EEC type-approval, granting of EEC type-approval, requirements and tests, modifications of the type, conformity of production, transitional provisions'**

3. Section 1: The first sentence reads as follows:

'This Directive applies to

— the tailpipe emissions, evaporative emissions, emissions of crankcase gases and the durability of anti-pollution devices for all motor vehicles equipped with positive-ignition engines  
and

— the tailpipe emissions and the durability of anti-pollution devices from vehicles of categories M<sub>1</sub> and N<sub>1</sub> (1) equipped with compression-ignition engines

covered by Article 1 of Directive 70/220/EEC in the version of Council Directive 83/351/EEC (\*), with the exception of those vehicles of category N<sub>1</sub> for which type-approval has been granted pursuant to Council Directive 88/77/EEC (\*\*).

(\*) OJ No L 197, 20. 7. 1983, p. 1.

(\*\*) OJ No L 36, 9. 2. 1988, p. 33.'

4. Footnote (1) reads as follows:

(1) As defined in Annex II A to Directive 70/156/EEC.'

5. Section 3.2 reads as follows:

'3.2. A model for the information document is given in Annex II.'

6. Section 3.2.1 is deleted.

7. Section 3.2.2 is deleted.

8. Section 3.2.3 becomes Section 3.2.1 and reads as follows:

'3.2.1. Where appropriate, copies of other type-approvals with the relevant data to enable extensions of approvals and establishment of deterioration factors shall also be submitted.'

9. A new Section 4.3 is added after Section 4.2 to read:

'4.3. An approval number in accordance with Annex VII to Directive 70/156/EEC shall be assigned to each type of vehicle approved. The same Member State shall not assign the same number to another type of vehicle.'

10. Figure I.5.2: 'mass' is replaced by 'maximum mass'.

11. Section 5.3.1.4:

— The first sentence reads as follows:

'Subject to the requirements of 5.3.1.5 the test must be repeated three times.'

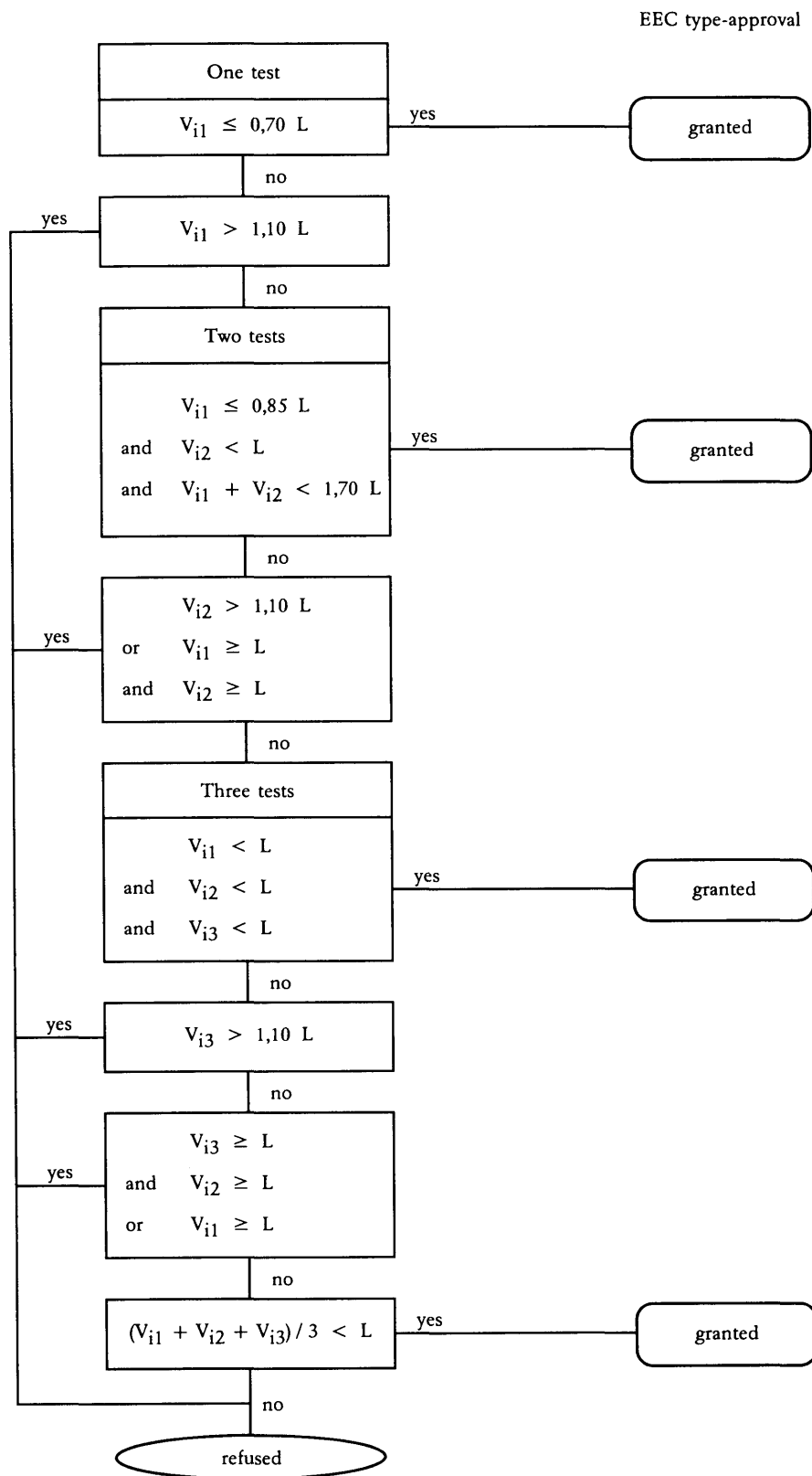
— Section 5.3.1.4.1: The footnote (1) is deleted.

— Section 5.3.1.4.2 is deleted.

— Figure I.5.3 is replaced by the new figure:

Figure I.5.3

Flow chart for the type I type-approval  
(see section 5.3.1)



12. Section 6 reads as follows:

**'6. Modifications of the type and amendments to approvals**

In the case of modifications of the type approved pursuant to this Directive, the provisions of Article 5 of Directive 70/156/EEC and, if applicable, the following special provisions shall apply:

13. Section 6.1.1.1 reads as follows:

'6.1.1.1. Approval granted to a vehicle type may be extended only to vehicle types of a reference mass requiring the use of the next two higher equivalent inertia or any lower equivalent inertia.'

14. Section 6.1.2.3. The end of the first sentence reads as follows:

'... subject to the approval of the technical service.'

15. Section 6.3.1.1. The following indent is added:

'— cylinder bore centre to centre dimensions.'

16. Section 6.3.1.2:

— In the Portuguese version 'conversor catalitico' is replaced by 'catalisador'.

— The third indent reads as follows:

'— size and shape of catalytic converters (volume of monolith  $\pm 10\%$ ),'

— In the tenth indent and after 'inlet of the catalytic converter),' the following sentence is added:

'This temperature variation shall be checked under stabilized conditions at a speed of 120 km/h and the load setting of type I test.'

17. Section 6.3.1.3 reads as follows:

'6.3.1.3. Inertia category: the two inertia categories immediately above and any inertia category below.'

18. Section 7.1.1 reads as follows:

'7.1.1. If a type I test is to be carried out and a vehicle type-approval has one or several extensions, the tests will be carried out either on the vehicle described in the initial information package or on the vehicle described in the information package relating to the relevant extension.'

*Annex II*

19. Annex II is replaced by a new Annex II to read as follows:

*ANNEX II***INFORMATION DOCUMENT No .....**

**pursuant to Annex I of Directive 70/156/EEC (\*) relating to EEC type-approval of a vehicle with respect to the measures to be taken against air pollution by emissions from motor vehicles (Directive 70/220/EEC, as last amended by Directive .../EC)**

The following information, if applicable, must be supplied in triplicate and include a list of contents. Any drawings must be supplied in appropriate scale and in sufficient detail on size A4 or on a folder of A4 format. Photographs, if any, must show sufficient detail.

If the systems, components or separate technical units have electronic controls, information concerning their performance must be supplied.

0. GENERAL
  - 0.1. Make (trade name of manufacturer): .....
  - 0.2. Type and general commercial description(s): .....
  - 0.3. Means of identification of type, if marked on the vehicle (b): .....
  - 0.3.1. Location of that marking: .....
  - 0.4. Category of vehicle (c): .....
  - 0.5. Name and address of manufacturer: .....
  - 0.8. Address(es) of assembly plant(s): .....
1. GENERAL CONSTRUCTION CHARACTERISTICS OF THE VEHICLE
  - 1.1. Photographs and/or drawings of a representative vehicle: .....
  - 1.3.3. Powered axles (numbers, position, interconnection): .....
2. MASSES AND DIMENSION (e) (in kg and mm)  
(Refer to drawing where applicable)
  - 2.6. Mass of vehicle with bodywork in running order, or mass of the chassis with cab if the manufacturer does not fit the bodywork (with standard equipment, including coolant, oils, fuel, tools, spare wheel and driver) (e) (maximum and minimum): .....
  - 2.8. Technically permissible maximum laden mass stated by the manufacturer (f) (maximum and minimum): .....
3. POWER PLANT (g)
  - 3.1. Manufacturer: .....
  - 3.1.1. Manufacturer's engine code (As marked on the engine, or other means of identification): ....
  - 3.2. Internal combustion engine
    - 3.2.1.1. Working principle: positive ignition/compression ignition, four stroke/two stroke (h)

(\*) The item numbers and footnotes used in this information document correspond to those set out in Annex I to Directive 70/156/EEC. Items not relevant for the purpose of this Directive are omitted.

- 3.2.1.2. Number and arrangements of cylinders: .....
- 3.2.1.2.1. Bore (°): ..... mm
- 3.2.1.2.2. Stroke (°): ..... mm
- 3.2.1.2.3. Firing order: .....
- 3.2.1.3. Engine capacity (°): ..... cm<sup>3</sup>
- 3.2.1.4. Volumetric compression ratio (°): .....
- 3.2.1.5. Drawings of combustion chamber, piston crown and, in the case of positive ignition engine, piston rings: .....
- 3.2.1.6. Idling speed (°): ..... min<sup>-1</sup>
- 3.2.1.7. Carbon monoxide content by volume in the exhaust gas with the engine idling (°): ..... % as stated by the manufacturer (positive ignition engines only)
- 3.2.1.8. Maximum net power (°): ..... kW at ..... min<sup>-1</sup> (manufacturer's declared value)
- 3.2.2. Fuel: diesel oil/petrol/LPG/any other (°)
- 3.2.2.1. RON, leaded: .....
- 3.2.2.2. RON, unleaded: .....
- 3.2.2.3. Fuel tank inlet: restricted orifice/label (°)
- 3.2.4. Fuel feed
- 3.2.4.1. By carburettor(s): yes/no (°)
- 3.2.4.1.1. Make(s): .....
- 3.2.4.1.2. Type(s): .....
- 3.2.4.1.3. Number fitted: .....
- 3.2.4.1.4. Adjustments (°):
- 3.2.4.1.4.1. Jets: ..... }
- 3.2.4.1.4.2. Venturis: ..... }
- 3.2.4.1.4.3. Float-chamber level: ..... }
- 3.2.4.1.4.4. Mass of float: ..... }
- 3.2.4.1.4.5. Float needle: ..... }
- Or the curve of fuel delivery plotted against the air flow and settings required to keep to the curve
- 3.2.4.1.5. Cold start system: manual/automatic (°)
- 3.2.4.1.5.1. Operating principle(s): .....
- 3.2.4.1.5.2. Operating limits/settings (°) (°): .....
- 3.2.4.2. By fuel injection (compression ignition only): yes/no (°)
- 3.2.4.2.1. System description: .....
- 3.2.4.2.2. Working principle: direct injection/pre-chamber/swirl chamber (°)
- 3.2.4.2.3. Injection pump
- 3.2.4.2.3.1. Make(s): .....
- 3.2.4.2.3.2. Type(s): .....
- 3.2.4.2.3.3. Maximum fuel delivery (°) (°): ..... mm<sup>3</sup>/stroke or cycle at a pump speed of: ..... min<sup>-1</sup> or, alternatively, a characteristic diagram: .....
- 3.2.4.2.3.4. Injection timing (°): .....
- 3.2.4.2.3.5. Injection advance curve (°): .....
- 3.2.4.2.3.6. Calibration procedure: test bench/engine (°)
- 3.2.4.2.4. Governor



- 3.2.4.2.4.1. Type: .....
- 3.2.4.2.4.2. Cut-off point
- 3.2.4.2.4.2.1. Cut-off point under load: ..... min<sup>-1</sup>
- 3.2.4.2.4.2.2. Cut-off point without load: ..... min<sup>-1</sup>
- 3.2.4.2.6. Injector(s)
- 3.2.4.2.6.1. Make(s): .....
- 3.2.4.2.6.2. Type(s): .....
- 3.2.4.2.6.3. Opening pressure (?): ..... kPa or characteristic diagram (?): .....
- 3.2.4.2.7. Cold start system
- 3.2.4.2.7.1. Make(s): .....
- 3.2.4.2.7.2. Type(s): .....
- 3.2.4.2.7.3. Description: .....
- 3.2.4.2.8. Auxiliary starting aid
- 3.2.4.2.8.1. Make(s): .....
- 3.2.4.2.8.2. Type(s): .....
- 3.2.4.2.8.3. System description: .....
- 3.2.4.3. By fuel injection (positive ignition only): yes/no (!)
- 3.2.4.3.1. Working principle: Intake manifold (single-/multi-point (!))/direct injection/other (specify) (!):  
.....
- 3.2.4.3.2. Make(s): .....
- 3.2.4.3.3. Type(s): .....
- 3.2.4.3.4. System description:
- 3.2.4.3.4.1. Type or number of the control unit: .....
- 3.2.4.3.4.2. Type of fuel regulator: .....
- 3.2.4.3.4.3. Type of air-flow sensor: .....
- 3.2.4.3.4.4. Type of fuel distributor: .....
- 3.2.4.3.4.5. Type of pressure regulator: .....
- 3.2.4.3.4.6. Type of microswitch: .....
- 3.2.4.3.4.7. Type of idling adjustment screw: .....
- 3.2.4.3.4.8. Type of throttle housing: .....
- 3.2.4.3.4.9. Type of water temperature sensor: .....
- 3.2.4.3.4.10. Type of air temperature sensor: .....
- 3.2.4.3.4.11. Type of temperature switch: .....
- 3.2.4.3.5. Injectors: opening pressure (?): ..... kPa or characteristic diagram (?): .....
- 3.2.4.3.6. Injection timing: .....
- 3.2.4.3.7. Cold start system
- 3.2.4.3.7.1. Operating principle(s): .....
- 3.2.4.3.7.2. Operating limits/settings (!) (?): .....
- 3.2.4.4. Feed pump
- 3.2.4.4.1. Pressure (?): ..... kPa or characteristic diagram (?): .....
- 3.2.6. Ignition
- 3.2.6.1. Make(s): .....

In the case of systems other than continuous injection give equivalent details

- 3.2.6.2. Type(s): .....
- 3.2.6.3. Working principle: .....
- 3.2.6.4. Ignition advance curve (?): .....
- 3.2.6.5. Static ignition timing (?): ..... degrees before TDC
- 3.2.6.6. Contact-point gap (?): ..... mm
- 3.2.6.7. Dwell-angle (?): ..... degrees
- 3.2.7. Cooling system (liquid/air) (!)
- 3.2.8. Intake system
- 3.2.8.1. Pressure charger: yes/no (!)
- 3.2.8.1.1. Make(s): .....
- 3.2.8.1.2. Type(s): .....
- 3.2.8.1.3. Description of the system (e.g. maximum charge pressure: ..... kPa, wastegate if applicable):  
.....
- 3.2.8.2. Intercooler: yes/no (!)
- 3.2.8.4. Description and drawings of the inlet pipes and their accessories (plenum chamber, heating device, additional air intakes, etc.): .....
- 3.2.8.4.1. Intake manifold description (include drawings and/or photos): .....
- 3.2.8.4.2. Air filter, drawings: ....., or
- 3.2.8.4.2.1. Make(s): .....
- 3.2.8.4.2.2. Type(s): .....
- 3.2.8.4.3. Intake silencer, drawings: ....., or
- 3.2.8.4.3.1. Make(s): .....
- 3.2.8.4.3.2. Type(s): .....
- 3.2.9. Exhaust system
- 3.2.9.2. Description and/or drawing of the exhaust system: .....
- 3.2.11. Valve timing or equivalent data
- 3.2.11.1. Maximum lift of valve, angles of opening and closing, or timing details of alternative distribution system, in relation to dead centres: .....
- 3.2.11.2. Reference and/or setting ranges (!): .....
- 3.2.12. Measures taken against air pollution
- 3.2.12.1. Device for recycling crankcase gases (description and drawings): .....
- 3.2.12.2. Additional anti-pollution devices (if any, and if not covered by another heading)
- 3.2.12.2.1. Catalytic converter: yes/no (!)
- 3.2.12.2.1.1. Number of catalytic converters and elements: .....
- 3.2.12.2.1.2. Dimensions, shape and volume of the catalytic converter(s): .....
- 3.2.12.2.1.3. Type of catalytic action: .....
- 3.2.12.2.1.4. Total charge of precious metals: .....
- 3.2.12.2.1.5. Relative concentration: .....
- 3.2.12.2.1.6. Substrate (structure and material): .....
- 3.2.12.2.1.7. Cell density: .....
- 3.2.12.2.1.8. Type of casing for the catalytic converter(s): .....
- 3.2.12.2.1.9. Location of the catalytic converter(s) (place and reference distance in the exhaust line): .....

- 3.2.12.2.1.10. Heat shield: yes/no (!)
- 3.2.12.2.2. Oxygen sensor: yes/no (!)
- 3.2.12.2.2.1. Type: .....
- 3.2.12.2.2.2. Location: .....
- 3.2.12.2.2.3. Control range: .....
- 3.2.12.2.3. Air injection: yes/no (!)
- 3.2.12.2.3.1. Type (pulse air, air pump etc.): .....
- 3.2.12.2.4. Exhaust gas recirculation: yes/no (!)
- 3.2.12.2.4.1. Characteristics (flow rate etc.): .....
- 3.2.12.2.5. Evaporative emissions control system: yes/no (!)
- 3.2.12.2.5.1. Detailed description of the devices and their state of tune: .....
- 3.2.12.2.5.2. Drawing of the evaporative control system: .....
- 3.2.12.2.5.3. Drawing of the carbon canister: .....
- 3.2.12.2.5.4. Mass of dry charcoal: ..... g
- 3.2.12.2.5.5. Schematic drawing of the fuel tank with indication of capacity and material: .....
- .....
- 3.2.12.2.5.6. Drawing of the heat shield between tank and exhaust system: .....
- 3.2.12.2.6. Particulate trap: yes/no (!)
- 3.2.12.2.6.1. Dimensions, shape and capacity of the particulate trap: .....
- 3.2.12.2.6.2. Type and design of the particulate trap: .....
- 3.2.12.2.6.3. Location (reference distance in the exhaust line): .....
- 3.2.12.2.6.4. Method or system of regeneration, description and/or drawing: .....
- 3.2.12.2.7. Other systems (description and operation): .....
4. TRANSMISSION (\*)
- 4.4. Clutch (type): .....
- 4.4.1. Maximum torque conversion: .....
- 4.5. Gearbox
- 4.5.1. Type (manual/automatic/CVT (!)): .....
- 4.6. Gear ratios

Gear	Internal gearbox ratios (ratios of engine to gearbox output shaft revolutions)	Final drive ratio(s) (ratio of gearbox output shaft to driven wheel revolutions)	Total gear ratios
Maximum for CVT (*)			
1			
2			
3			
...			
Minimum for CVT (*)			
Reverse			

(\*) Continuously variable transmission

6. SUSPENSION
- 6.6. Tyres and wheels
- 6.6.1. Tyre / wheel combination(s) (for tyres indicate size designation, minimum load-capacity index, minimum speed category symbol; for wheels indicate rim size(s) and off-set(s))
- 6.6.1.1. Axles
- 6.6.1.1.1. Axle 1: .....
- 6.6.1.1.2. Axle 2: .....
- 6.6.1.1.3. Axle 3: .....
- 6.6.1.1.4. Axle 4: .....
- etc.
- 6.6.2. Upper and lower limits of rolling radii
- 6.6.2.1. Axle 1: .....
- 6.6.2.2. Axle 2: .....
- 6.6.2.3. Axle 3: .....
- 6.6.2.4. Axle 4: .....
- etc.
- 6.6.3. Tyre pressure(s) as recommended by the vehicle manufacturer: ..... kPa
9. BODYWORK
- 9.10.3. Seats
- 9.10.3.1. Number: .....
- Date, file

*Appendix*

INFORMATION ON TEST CONDITIONS

1. **Spark plugs**
- 1.1. Make: .....
- 1.2. Type: .....
- 1.3. Spark-gap setting: .....
2. **Ignition coil**
- 2.1. Make: .....
- 2.2. Type: .....
3. **Ignition condenser**
- 3.1. Make: .....
- 3.2. Type: .....
4. **Lubricant used**
- 4.1. Make: .....
- 4.2. Type: .....

## Annex III

20. Section 4.1.4.2: The end of the second sentence reads as follows:  
'... must be 5 % at 120, 100, 80, 60 and 40, and 10 % at 20 km/h.'
21. Section 4.1.5.2: The end of the first sentence reads as follows:  
'... speeds of 120, 100, 80, 60, 40 and 20 km/h.'
22. Section 4.2.3:  
— The first sentence is deleted.  
— Figure III.4.2.3 is deleted.
23. Section 4.2.7: After the comma reads as follows:  
'... the connecting tubes must be connected as near as possible to the vehicle but in such a manner so as not to effect the functioning of the vehicle.'
24. Section 4.3.1.2:  
— The second sentence reads as follows:  
'Measurement error must not exceed  $\pm 2$  % (intrinsic error of analyser) disregarding the true value for the calibration gases. For concentrations of less than 100 ppm the measurement error must not exceed  $\pm 2$  ppm. The ambient air sample must be measured on the same analyser with an appropriate range.'  
— The third and fourth sentence are deleted.  
— The last sentence reads as follows:  
'The microgram balance used to determine the weight of all filters must have an accuracy of 5  $\mu\text{g}$  and readability of 1  $\mu\text{g}$ .'
25. Section 4.3.2: The third sentence in the third section reads as follows:  
'The sampling probe for the test gas flow for particulates must be so arranged within the dilution tract that a representative sample gas flow can be taken from the homogeneous air/exhaust mixture and an air/exhaust gas mixture temperature of 325 K (52 °C) is not exceeded immediately before the particulate filter.'
26. Section 5.1:  
— The table is replaced by the following new table:

Reference mass of vehicle RW (kg)	Equivalent inertia I (kg)
RW $\leq$ 480	455
480 < RW $\leq$ 540	510
540 < RW $\leq$ 595	570
595 < RW $\leq$ 650	625
650 < RW $\leq$ 710	680
710 < RW $\leq$ 765	740
765 < RW $\leq$ 850	800
850 < RW $\leq$ 965	910
965 < RW $\leq$ 1 080	1 020
1 080 < RW $\leq$ 1 190	1 130
1 190 < RW $\leq$ 1 305	1 250
1 305 < RW $\leq$ 1 420	1 360
1 420 < RW $\leq$ 1 530	1 470
1 530 < RW $\leq$ 1 640	1 590
1 640 < RW $\leq$ 1 760	1 700
1 760 < RW $\leq$ 1 870	1 810
1 870 < RW $\leq$ 1 980	1 930
1 980 < RW $\leq$ 2 100	2 040
2 100 < RW $\leq$ 2 210	2 150
2 210 < RW $\leq$ 2 380	2 270
2 380 < RW $\leq$ 2 610	2 270
2 610 < RW	2 270'

— After the table the following sentence is added:

'If the corresponding equivalent inertia is not available on the dynamometer, the larger value closest to the vehicle reference mass will be used.'

27. Section 5.3.1: After the first section the following section is added:

'At the request of the manufacturer vehicles with positive ignition engine may be preconditioned with one Part I and two Part II driving cycles.'

28. Section 6.1.3 reads as follows:

'6.1.3. At the end of the first 40-second idling period (see 6.2.2) a current of air of variable speed shall be blown over the vehicle. The blower speed shall be such that, within the operating range of 10 km/h to at least 50 km/h, the linear velocity of the air at the blower outlet is within  $\pm 5$  km/h of the corresponding roller speed. The final selection of the blower shall have the following characteristics:

- Area: at least 0,2 m<sup>2</sup>
- Height of the lower edge above ground: approximately 20 cm
- Distance from the front of the vehicle: approximately 30 cm

As an alternative the blower speed shall be at least 6m/s (21,6 km/h). At the request of the manufacturer for special vehicles (e.g. vans, off-road) the height of the cooling fan can be modified.'

29. Section 6.1.4 reads as follows:

'6.1.4. During the test the speed is recorded against time or collected by the data acquisition system so that the correctness of the cycles performed can be assessed.'

30. Section 6.3.1:

— The following text is added:

'See Appendix tables III.1.2 and III.1.3.'

— Sections 6.3.1.1 to 6.3.1.6 are deleted.

## Appendix 2

31. Section 1.1: '100 km/h' is replaced by '120 km/h'.

32. Section 1.2.2 reads as follows:

'1.2.2. The load absorbed by the brake and the chassis dynamometer internal frictional effects from the speed of 0 to 120 km/h is as follows:

$$F = (a + b \cdot V^2) \pm 0,1 \cdot F_{80} \text{ (without being negative)}$$

where:

F = total load absorbed by the chassis dynamometer (N)

a = value equivalent to rolling resistance (N)

b = value equivalent to coefficient of air resistance (N/(km/h)<sup>2</sup>)

V = speed (km/h)

F<sub>80</sub> = load at the speed of 80 km/h (N).'

33. Section 2.1: The first two sentences read as follows:

'This Appendix describes the method to be used to determine the load absorbed by a dynamometer brake.

The load absorbed comprises the load absorbed by frictional effects and the load absorbed by the power-absorption device.'

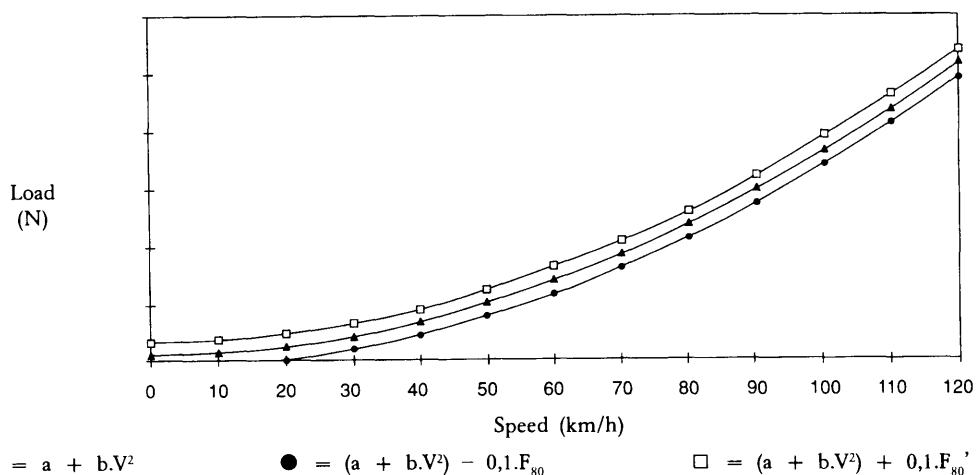
34. Section 2.2: The head line reads as follows:

'Calibrating the load indicator to 80 km/h as a function of the load absorbed.'

35. Figure III.2.2.2 is replaced by the following figure:

Figure III.2.2.2.

Diagram illustrating the load of the chassis dynamometer



36. Section 2.2.5 reads as follows

'2.2.5. Note the load indicated  $F_i$  (N)'.

37. Section 2.2.10: 'road power' is replaced by 'load'.

38. Section 2.2.11 reads as follows:

'2.2.11. Calculate the load absorbed, using the formula:

$$F = \frac{M_i \cdot \Delta V}{t}$$

where

F = load absorbed in N

 $M_i$  = equivalent inertia in kilograms (excluding the inertial effects of free rear roller) $\Delta V$  = speed deviation in m/s (10 km/h = 2,775 m/s)

t = time taken by the roller to pass from 85 to 75 km/h.'

39. Section 2.2.12:

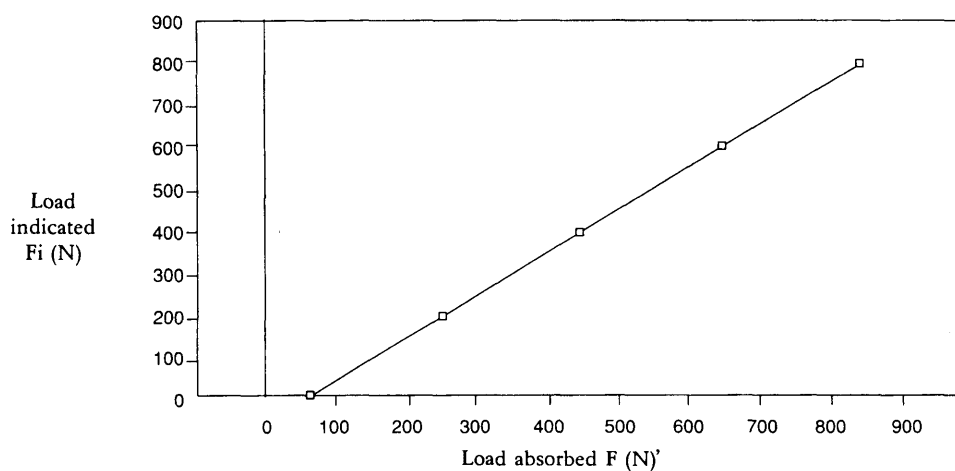
— Section 2.2.12 reads as follows:

'2.2.12. Figure III.2.2.12 shows the load indicated at 80 km/h in terms of the load absorbed at 80 km/h.'

— Figure III.2.2.12 is replaced by the following:

Figure III.2.2.12

Load indicated at 80 km/h in terms of load absorbed at 80 km/h



## 40. Section 2.3:

The head line reads as follows:

'Calibration of the load indicator as a function of the absorbed load for other speeds'

## 41. Section 2.4:

'power' is replaced by 'load'.

## 42. Section 2.4.2:

'power ( $P_a$ )' is replaced by 'load'.

## 43. Section 2.4.3 reads as follows:

'2.4.3. Note the load absorbed at 120, 100, 80, 60, 40 and 20 km/h.'

## 44. Section 2.4.4 reads as follows:

'2.4.4. Draw the curve  $F(V) \dots$ '

## 45. Section 2.4.5:

'power  $P_a$ ' is replaced by 'load F'.

## 46. Section 3.1 reads as follows:

'3.1. Setting methods

The dynamometer setting may be carried out at a constant speed of 80 km/h in accordance with the requirements of Appendix 3.'

## 47. Section 3.2 reads as follows:

'3.2. Alternative method

With the manufacturer's agreement the following method may be used:

3.2.1. The brake is adjusted so as to absorb the load exerted at the driving wheels at a constant speed of 80 km/h in accordance with the following table:

Reference mass of vehicles	Equivalent inertia	Power and load absorbed by the dynamometer at 80 km/h		Coefficients	
				a	b
RW (kg)	kg	kW	N	N	N/(km/h) <sup>2</sup>
$RW \leq 480$	455	3,8	171	3,8	0,0261
$480 < RW \leq 540$	510	4,1	185	4,2	0,0282
$540 < RW \leq 595$	570	4,3	194	4,4	0,0296
$595 < RW \leq 650$	625	4,5	203	4,6	0,0309
$650 < RW \leq 710$	680	4,7	212	4,8	0,0323
$710 < RW \leq 765$	740	4,9	221	5,0	0,0337
$765 < RW \leq 850$	800	5,1	230	5,2	0,0351
$850 < RW \leq 965$	910	5,6	252	5,7	0,0385
$965 < RW \leq 1\ 080$	1\ 020	6,0	270	6,1	0,0412
$1\ 080 < RW \leq 1\ 190$	1\ 130	6,3	284	6,4	0,0433
$1\ 190 < RW \leq 1\ 305$	1\ 250	6,7	302	6,8	0,0460
$1\ 305 < RW \leq 1\ 420$	1\ 360	7,0	315	7,1	0,0481
$1\ 420 < RW \leq 1\ 530$	1\ 470	7,3	329	7,4	0,0502
$1\ 530 < RW \leq 1\ 640$	1\ 590	7,5	338	7,6	0,0515
$1\ 640 < RW \leq 1\ 760$	1\ 700	7,8	351	7,9	0,0536
$1\ 760 < RW \leq 1\ 870$	1\ 810	8,1	365	8,2	0,0557
$1\ 870 < RW \leq 1\ 980$	1\ 930	8,4	378	8,5	0,0577
$1\ 980 < RW \leq 2\ 100$	2\ 040	8,6	387	8,7	0,0591
$2\ 100 < RW \leq 2\ 210$	2\ 150	8,8	396	8,9	0,0605
$2\ 210 < RW \leq 2\ 380$	2\ 270	9,0	405	9,1	0,0619
$2\ 380 < RW \leq 2\ 610$	2\ 270	9,4	423	9,5	0,0646
$2\ 610 < RW$	2\ 270	9,8	441	9,9	0,0674



3.2.2. In the case of vehicles, other than passenger cars, with a reference mass of more than 1 700 kg, or vehicles with permanent all-wheel drive, the power values given in the table set out in 3.2.1 are multiplied by the factor 1,3.'

48. Section 3.3, 3.3.1 and 3.3.2 are deleted.

### Appendix 3

49. Section 4.1:

— Section 4.1 reads as follows:

'4.1. Selection of the test vehicle

If not all variants of a vehicle type (1) are measured the following criteria for the selection of the test vehicle shall be used.

4.1.1. Body

If there are different types of body, the worst one in terms of aerodynamics shall be chosen. The manufacturer shall provide appropriate data for the selection.

4.1.2. Tyres

The widest tyre shall be chosen. If there are more than three tyre sizes, the widest minus one shall be chosen.

4.1.3. Testing mass

The testing mass shall be the reference mass of the vehicle with the highest inertia range.

4.1.4. Engine

The test vehicle shall have the largest heat exchanger(s).

4.1.5. Transmission

A test shall be carried out with each type of the following transmissions:

- front wheel drive
- rear wheel drive
- full time 4 × 4
- part time 4 × 4
- automatic gear box
- manual gear box

(1) According to Directive 70/156/EEC.'

— Former Sections 4.1, 4.2 and 4.3 becomes Sections 4.2, 4.3 and 4.4.

50. The following section 5.1.1.2.8 is added:

'5.1.1.2.8. The power (P) determined on the track shall be corrected to the reference ambient conditions as follows:

$$P_{\text{corrected}} = K \cdot P_{\text{measured}}$$

$$K = \frac{R_R}{R_T} \cdot [1 + K_R(t - t_0)] + \frac{R_{\text{AERO}}}{R_T} \cdot \frac{(\rho_0)}{\rho}$$

where

$R_R$  = rolling resistance at speed V

$R_{\text{AERO}}$  = aerodynamic drag at speed V

$R_T$  = total driving resistance =  $R_R + R_{\text{AERO}}$

$K_R$  = temperature correction factor of rolling resistance, taken to be equal to:  $3,6 \cdot 10^{-3}/^{\circ}\text{C}$

t = road test ambient temperature in  $^{\circ}\text{C}$

$t_0$  = reference ambient temperature =  $20^{\circ}\text{C}$

$\rho$  = air density at the test conditions

$\rho_0$  = air density at the reference conditions ( $20^{\circ}\text{C}$ , 100 kPa)

The ratios  $R_R/R_T$  and  $R_{\text{AERO}}/R_T$  shall be specified by the vehicle manufacturer on the basis of the data normally available to the company.

If these values are not available, subject to the agreement of the manufacturer and the technical service concerned, the figures for the rolling/total resistance ratio given by the following formula may be used:

$$\frac{R_R}{R_T} = a \cdot M + b$$

where:

M = vehicle mass in kg

and for each speed the coefficients a and b are shown in the following table:

V (km/h)	a	b
20	$7,24 \cdot 10^{-5}$	0,82
30	$1,25 \cdot 10^{-4}$	0,67
40	$1,59 \cdot 10^{-4}$	0,54
50	$1,86 \cdot 10^{-4}$	0,42
90	$1,71 \cdot 10^{-4}$	0,21
120	$1,57 \cdot 10^{-4}$	0,14'

51. Section 5.1.2.2.6 reads as follows:

- '5.1.2.2.6. Adjust the brake to reproduce the corrected power (Section 5.1.1.2.8) and to take into account the difference between the vehicle mass (M) on the track and the equivalent inertia test mass (I) to be used. This may be done by calculating the mean corrected road coast down time from  $V_2$  to  $V_1$  and reproducing the same time on the dynamometer by the following relationship:

$$T_{\text{corrected}} = \frac{T_{\text{measured}}}{K} \cdot \frac{I}{M}$$

K = specified in 5.1.1.2.8.'

52. A new Section 5.1.2.2.7 is added:

- '5.1.2.2.7. The power  $P_a$  to be absorbed by the bench should be determined in order to enable the same power (Section 5.1.1.2.8) to be reproduced for the same vehicle on different days.'

53. Section 5.2.1.2.2 reads as follows:

- '5.2.1.2.2. Record the torque  $C_0$  and speed over a period of least 20 s. The accuracy of the data recording system shall be at least  $\pm 1$  Nm for the torque and  $\pm 0,2$  km/h for the speed.'

54. Section 5.2.1.2.5 reads as follows:

- '5.2.1.2.5. The test shall be carried out three times in each direction. Determine the average torque from these six measurements for the reference speed. If the average speed deviates by more than 1 km/h from the reference speed, a linear regression shall be used for calculating the average torque.'

55. A new Section 5.2.1.2.7 is added:

- '5.2.1.2.7. The average torque  $C_T$  determined on the track shall be corrected to the reference ambient conditions as follows:

$$C_{T\text{corrected}} = K \cdot C_{T\text{measured}}$$

where K is defined in 5.1.1.2.8 of this Appendix.'

56. Section 5.2.2.2.3 reads as follows:

- '5.2.2.2.3. Adjust the power absorption unit to reproduce the corrected total track torque of 5.2.1.2.7.'

57. A new Section 5.2.2.2.4 is added:

- '5.2.2.2.4. Proceed with the same operations as in 5.1.2.2.7, for the same purpose.'

58. Section 5.3 is deleted.

59. Section 5.4 is deleted.

*Appendix 4*

## 60. Section 1:

The following sentence is added:

'The manufacturer of the dynamometer shall provide a method to verify the specifications according to Section 3.'

## 61. Section 5 is deleted.

*Appendix 5*

## 62. In the Portuguese version, the title reads as follows:

'Descrição dos sistemas de recolha dos gases de escape'.

## 63. Section 3.3 including Figure III.5.3.3 is deleted.

*Appendix 8*

## 64. Section 1.5.1.1:

The last line reads as follows:

'saturation vapour pressure:  $P_d = 2,81$  kPa of  $H_2O$  at  $23^\circ C$ .'

## 65. Section 1.5.2.1. reads as follows:

'1.5.2.1. Humidity correction factor ( $K_H$ ) (see formula (6))

$$H = \frac{6,211 \cdot R_a \cdot P_d}{P_b - P_d \cdot R_a \cdot 10^{-2}}$$

$$H = \frac{6,211 \cdot 60 \cdot 3,2}{101,33 - (2,81 \cdot 0,6)}$$

$$H = 10,5092$$

$$k_H = \frac{1}{1 - 0,0329 \cdot (H - 10,71)}$$

$$k_H = \frac{1}{1 - 0,0329 \cdot (10,5092 - 10,71)}$$

$$k_H = 0,9934'$$

## 66. Section 1.5.2.3:

The last two lines read as follows:

$$M_{NOX} = 70 \cdot 51961 \cdot 2,05 \cdot 0,9934 \cdot 10^{-6} \frac{1}{d}$$

$$M_{NOX} = \frac{7,41}{d} \text{ g/km}'$$

*Annex V*

## 67. Section 3.2:

In the second table 'type I tests' is replaced by 'type I test at 50 km/h'.

*Annex VI*

## 68. Section 5.1.5:

The first sentence reads as follows:

'The fuel tank(s) is (are) refilled with the specified test fuel at a temperature below 287 K ( $14^\circ C$ ) to 40 %  $\pm$  2 % of its/their normal fuel capacity.'

## 69. A new Section 7.3.6 is added:

'7.3.6. At the request of the manufacturer the functional capacity for venting can be demonstrated by equivalent alternative procedure. The specific procedure should be demonstrated by the manufacturer to the technical service during the type approval procedure.'

## 70. A new Section 7.4.4.3 is added:

'7.4.4.3. At the request of the manufacturer an alternative purge test procedure can be used, if the procedure has been presented to and has been accepted by the technical service during the type approval procedure.'

*Annex IX*

## 71. Annex IX is replaced by the following new Annex:

## ANNEX IX

## MODEL

(Maximum format: A4 (210 × 297 mm))

## EEC TYPE-APPROVAL CERTIFICATE

Stamp of administration
----------------------------

Communication concerning the

- type-approval <sup>(1)</sup>,
- extension of type-approval <sup>(1)</sup>,
- refusal of type-approval <sup>(1)</sup>,
- withdrawal of type-approval <sup>(1)</sup>,

of a type of a vehicle / component / separate technical unit <sup>(1)</sup> with regard to Directive .../.../EC, as last amended by Directive .../.../EC.

Type-approval number: .....

Reason for extension: .....

## SECTION I

- 0.1. Make (trade name of manufacturer): .....
- 0.2. Type and general commercial description(s): .....
- 0.3. Means of identification of type if marked on the vehicle / component / separate technical unit <sup>(1)</sup> <sup>(2)</sup>: ...
- 0.3.1. Location of that marking: .....
- 0.4. Category of vehicle <sup>(3)</sup>: .....
- 0.5. Name and address of manufacturer: .....
- 0.7. In the case of components and separate technical units, location and method of affixing of the EEC approval mark: .....
- 0.8. Address(es) of assembly plant(s): .....

## SECTION II

1. Additional information (where applicable): See Addendum
2. Technical service responsible for carrying out the tests: .....
3. Date of test report: .....
4. Number of test report: .....
5. Remarks (if any): See Addendum
6. Place: .....
7. Date: .....
8. Signature: .....
9. The index to the information package lodged with the approval authority, which may be obtained on request, is attached.

<sup>(1)</sup> Delete where not applicable.<sup>(2)</sup> If the means of identification of type contains characters not relevant to describe the vehicle, component or separate technical unit types covered by this type-approval certificate such characters shall be represented in the document by the symbol: "???" (e.g. ABC??123??).<sup>(3)</sup> As defined in Annex II A to Directive 70/156/EEC.

Appendix

Addendum to EEC type-approval certificate No ...

concerning the type-approval of a vehicle with regard to Directive 70/220/EEC, as last amended by Directive .../.../EC

- 1. Additional information
- 1.1. Mass of the vehicle in running order: .....
- 1.2. Maximum mass: .....
- 1.3. Reference mass: .....
- 1.4. Number of seats: .....
- 1.5. Engine identification: .....
- 1.6. Gearbox
- 1.6.1. Manual, number of speeds (!): .....
- 1.6.2. Automatic, number of ratios (!): .....
- 1.6.3. Continuously variable: yes/no (!)
- 1.6.4. Ratio of the individual gears: .....
- 1.6.5. Ratio of final drive: .....
- 1.7. Range of tyre sizes: .....
- 1.7.1. Rolling circumference of tyres used for the Type I test: .....
- 1.8. Test results: .....

Type I	CO (g/km)	HC + NO <sub>x</sub> (g/km)	Particulates (!) (g/km)
measured			
with DF			

- Type II: ..... %
- Type III: .....
- Type IV: ..... g/test
- Type V: — Durability type: 80 000 km, not applicable (!)
- Deterioration factor DF: calculated, fixed (!)
- Specify the values: .....
- 5. Remarks: .....

(!) Delete where applicable.

(?) For compression ignition engines.

