

COMMISSION DIRECTIVE 1999/102/EC**of 15 December 1999****adapting to technical progress Council Directive 70/220/EEC 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 ⁽¹⁾, as last amended by Directive 98/69/EC of the European Parliament and of the Council ⁽²⁾, and in particular Article 5 thereof,

Whereas:

- (1) Directive 70/220/EEC is one of the separate directives under the type-approval procedure laid down by Council Directive 70/156/EEC of 6 February 1970 on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers ⁽³⁾, as last amended by Directive 98/91/EC of the European Parliament and of the Council ⁽⁴⁾.
- (2) Directive 70/220/EEC lays down the specifications for the testing of emissions of the motor vehicles covered by its scope. In view of the recent experience gained and the rapidly developing state of the art of on-board diagnostic (OBD) systems, it is appropriate to adapt those specifications accordingly with effect from the dates specified in Directive 98/69/EC.
- (3) It is necessary to clarify the dates of application of the OBD requirements of this Directive for new types and all types of vehicles of category M₁ equipped with compression-ignition engines and the maximum mass of which exceeds 2 500 kg and for vehicles in category N₁ classes II and III.
- (4) It is appropriate to clarify the OBD requirements in relation to tamper prevention, disablement of engine misfire monitoring during certain operating conditions, the storage of distance travelled by the vehicle while a malfunction is indicated to the driver through the malfunction indicator, the capability of the OBD system to perform bi-directional logic control, the use of the P1 and P0 fault code sets of ISO 15031-6, the diagnostic connector and to express the OBD threshold limits to two decimal places. It is appropriate to introduce revised provisions for misfire monitoring under conditions

likely to cause catalyst damage to reduce the possibility of false fault indications and to introduce the possibility of partial catalyst volume monitoring and the use of the enhanced on-board to off-board communications link provided by controller area network (CAN).

- (5) It is appropriate to allow the type-approval of vehicles with OBD systems that contain a limited number of minor deficiencies that may arise at, or prior to the time of type-approval or are discovered when vehicles are already in service. The type-approval authority may also issue an extension to the type-approval certificate for vehicles that have already been type-approved in cases where deficiencies are subsequently found within the OBD system on vehicles in-service. Such extensions may not be issued if there is a complete lack of monitoring capability. A period should be specified within which deficiencies authorised by the authority must be corrected on future manufactured vehicles.
- (6) 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

Annexes I, VI, X and XI to Directive 70/220/EEC are amended in accordance with the Annex to this Directive.

Article 2

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 31 December 1999 at the latest. They shall forthwith inform the Commission thereof.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

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

⁽¹⁾ OJ L 76, 6.4.1970, p. 1.

⁽²⁾ OJ L 350, 28.12.1998, p. 1.

⁽³⁾ OJ L 42, 23.2.1970, p. 1.

⁽⁴⁾ OJ L 11, 16.1.1999, p. 25.

Article 3

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

Article 4

This Directive is addressed to the Member States.

Done at Brussels, 15 December 1999.

For the Commission

Erkki LIIKANEN

Member of the Commission

ANNEX

AMENDMENTS TO ANNEXES I, VI, X AND XI TO DIRECTIVE 70/220/EEC

A. Annex I is amended as follows:

1. Section 5.1.4.1 is replaced by the following:

'5.1.4.1. Any vehicle with an emission control computer must include features to deter modification, except as authorised by the manufacturer. The manufacturer shall authorise modifications if these modifications are necessary for the diagnosis, servicing, inspection, retrofitting or repair of the vehicle. Any reprogrammable computer codes or operating parameters must be resistant to tampering and afford a level of protection at least as good as the provisions in ISO DIS 15031-7; dated October 1998 (SAE J2186 dated October 1996) provided that the security exchange is conducted using the protocols and diagnostic connector as prescribed in Section 6.5 of Annex XI, Appendix 1. Any removable calibration memory chips must be potted, encased in a sealed container or protected by electronic algorithms and must not be changeable without the use of specialised tools and procedures.'

2. Section 5.1.4.5 is replaced by the following:

'5.1.4.5. Manufacturers using programmable computer code systems (e.g. electrical erasable programmable read-only memory, EEPROM) must deter unauthorised reprogramming. Manufacturers must include enhanced tamper-protection strategies and write protect features requiring electronic access to an off site computer maintained by the manufacturer. Methods giving an adequate level of tamper protection will be approved by the authority.'

3. Sections 8.1, 8.2, 8.3 and 8.4 are replaced by the following:

8.1. Vehicles with positive-ignition engines

With effect from 1 January 2000 for new types and from 1 January 2001 for all types, vehicles of category M_1 , except vehicles the maximum mass of which exceeds 2 500 kg, and vehicles of category N_1 class I, must be fitted with an on-board diagnostic (OBD) system for emission control in accordance with Annex XI.

With effect from 1 January 2001 for new types and from 1 January 2002 for all types, vehicles of category N_1 classes II and III and vehicles of category M_1 , the maximum mass of which exceeds 2 500 kg, must be fitted with an OBD system for emission control in accordance with Annex XI.

8.2. Vehicles with compression-ignition engines

Vehicles of category M_1 , except

- vehicles designed to carry more than six occupants including the driver,
- vehicles whose maximum mass exceeds 2 500 kg,

from 1 January 2003 for new types and from 1 January 2004 for all types, must be fitted with an on-board diagnostic (OBD) system for emission control in accordance with Annex XI.

Where new types of compression-ignition engines entering into service prior to this date are fitted with an OBD system, the provisions of sections 6.5.3 to 6.5.3.6 of Annex XI, Appendix 1, are applicable.

8.3. Vehicles with compression-ignition engines exempt from Section 8.2

From 1 January 2005 for new types and from 1 January 2006 for all types, vehicles of category M_1 exempted by Section 8.2, except vehicles of category M_1 equipped with compression-ignition engines and the maximum mass of which exceeds 2 500 kg, and vehicles in category N_1 class 1 equipped with compression-ignition engines, must be fitted with on-board diagnostic (OBD) systems for emission control in accordance with Annex XI.

From 1 January 2006 for new types and 1 January 2007 for all types, vehicles in category N_1 , classes II and III equipped with compression-ignition engines and vehicles of category M_1 equipped with compression-ignition engines and the maximum mass of which exceeds 2 500 kg, must be fitted with on-board diagnostic (OBD) systems for emission control in accordance with Annex XI.

Where compression-ignition engined vehicles entering into service prior to the dates given in this section are fitted with OBD systems, the provisions of Sections 6.5.3 to 6.5.3.6 of Annex XI, Appendix 1, are applicable.

8.4. Vehicles of other categories

Vehicles of other categories or vehicles of category M₁ and N₁ not covered by 8.1, 8.2 or 8.3, may be fitted with an OBD system. In this case, Sections 6.5.3 to 6.5.3.6 of Annex XI, Appendix 1 are applicable.

- B. In Annex VI, the table in Appendix 2 entitled 'Diurnal ambient temperature profile for the calibration of the enclosure and the diurnal emission test' is replaced by the following table:

'Diurnal ambient temperature profile for the calibration of the enclosure and the diurnal emission test

Time (hours)		Temperature (°C)
Calibration	Test	
13	0/24	20
14	1	20,2
15	2	20,5
16	3	21,2
17	4	23,1
18	5	25,1
19	6	27,2
20	7	29,8
21	8	31,8
22	9	33,3
23	10	34,4
24/0	11	35
1	12	34,7
2	13	33,8
3	14	32
4	15	30
5	16	28,4
6	17	26,9
7	18	25,2
8	19	24
9	20	23
10	21	22
11	22	20,8
12	23	20,2'

- C. Annex X is amended as follows:

1. The table in Section 1.8. is replaced by the following table:

Type 1	CO (g/km)	THC (³) (g/km)	NO _x (g/km)	THC+NO _x (²) (g/km)	Particulates (²) (g/km)
Measured					
with DF					

- 2. Sections 1.8.1 to 1.8.5 are renumbered as 1.8.2 to 1.8.6.
- 3. Footnote 4 in Sections 1.8.3.1 to 1.8.3.4 is renumbered as footnote 3. Footnote 5 in Sections 1.8.3.5 to 1.8.3.8 is renumbered as footnote 2.
Footnotes 4 and 5 are deleted.

D. Annex XI is amended as follows:

- 1. In the English version, Section 2.19 is added as follows:

'2.19. "Repair information" means all information required for diagnosis, servicing, inspection, periodic monitoring or repair of the vehicle and which the manufacturers provide for their authorised dealers/repair shops. Where necessary, such information shall include service handbooks, technical manuals, diagnosis information (e.g. minimum and maximum theoretical values for measurements), wiring diagrams, the software calibration identification number applicable to a vehicle type, instructions for individual and special cases, information provided concerning tools and equipment, data record information and two-directional monitoring and test data. The manufacturer shall not be obliged to make available that information which is covered by intellectual property rights or constitutes specific know-how of manufacturers and/or OEM suppliers; in this case the necessary technical information shall not be improperly withheld.'

- 2. This item only concerns the Portuguese version.
- 3. A section 2.20 is added as follows:

'2.20 "Deficiency" means, in respect of vehicle OBD systems, that up to two separate components or systems that are monitored contain temporary or permanent operating characteristics that impair the otherwise efficient OBD monitoring of those components or systems or do not meet all of the other detailed requirements for OBD. Vehicles may be type-approved, registered and sold with such deficiencies according to the requirements of Section 4 of this Annex.'

- 4. Section 3.1.1 is replaced by the following:

'3.1.1. Access to the OBD system required for the inspection, diagnosis, servicing or repair of the vehicle must be unrestricted and standardised. All emission-related fault codes must be consistent with Section 6.5.3.4 of Appendix 1 to this Annex.'

- 5. Section 3.2.2.2 is replaced by the following:

'3.2.2.2. When a manufacturer can demonstrate to the authority that the detection of higher levels of misfire percentages is still not feasible, or that misfire cannot be distinguished from other effects (e.g. rough roads, transmission shifts, after engine starting; etc.) the misfire monitoring system may be disabled when such conditions exist.'

- 6. Section 3.3.2 and the table are replaced by the following:

'3.3.2. The OBD system must indicate the failure of an emission-related component or system when that failure results in emissions exceeding the threshold limits given below:

Category	Class	Reference mass (RW) (kg)	Mass of carbon monoxide		Mass of total hydrocarbons		Mass of oxides of nitrogen		Mass of particulates ⁽¹⁾
			(CO) L ₁ (g/km)	(THC) L ₂ (g/km)	(NO _x) L ₃ (g/km)	(PM) L ₄ (g/km)			
			Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	Diesel
M ⁽²⁾ ⁽⁴⁾	—	all	3,20	3,20	0,40	0,40	0,60	1,20	0,18
N ₁ ⁽³⁾ ⁽⁴⁾	I	RW ≤ 1305	3,20	3,20	0,40	0,40	0,60	1,20	0,18
	II	1305 < RW ≤ 1760	5,80	4,00	0,50	0,50	0,70	1,60	0,23
	III	1760 < RW	7,30	4,80	0,60	0,60	0,80	1,90	0,28

⁽¹⁾ For compression ignition engines.

⁽²⁾ Except vehicles the maximum mass of which exceeds 2 500 kg.

⁽³⁾ And those category M vehicles which are specified in note 2.

⁽⁴⁾ The Commission proposal referred to in Article 3(1) of this Directive shall contain the threshold limit values for OBD for 2005/6 for M₁ and N₁ vehicles.'

- 7. Section, 3.3.3.1 is replaced by the following:

'3.3.3.1. Reduction in the efficiency of the catalytic converter with respect to the emissions of HC only. Manufacturers may monitor the front catalyst alone or in combination with the next catalyst(s) downstream. Each monitored catalyst or catalyst combination shall be considered malfunctioning when the emissions exceed the HC threshold given in the table in Section 3.3.2.'

8. Section 3.3.3.5 is replaced by the following:

'3.3.3.5. Unless otherwise monitored, any other emission-related powertrain component connected to a computer, including any relevant sensors to enable monitoring functions to be carried out, must be monitored for circuit continuity.'

9. Section 3.3.4.5 is replaced by the following:

'3.3.4.5. Unless otherwise monitored, any other emission-related powertrain component connected to a computer must be monitored for circuit continuity.'

10. Section 3.6.1 is replaced by the following:

'3.6.1. The distance travelled by the vehicle while the MI is activated must be available at any instant through the serial port on the standard link connector ⁽²⁾.

⁽²⁾ This requirement is only applicable from 1 January 2003 to new types of vehicles with an electronic speed input to the engine management. It applies to all new types of vehicles entering into service from 1 January 2005.'

11. Section 3.7.1 is replaced by the following:

'3.7.1. If misfire at levels likely to cause catalyst damage (as specified by the manufacturer) is not present any more, or if the engine is operated after changes to speed and load conditions where the level of misfire will not cause catalyst damage, the MI may be switched back to the previous state of activation during the first driving cycle on which the misfire level was detected and may be switched to the normal activated mode on subsequent driving cycles. If the MI is switched back to the previous state of activation, the corresponding fault codes and stored freeze-frame conditions may be erased.'

12. A Section 4 is added as follows:

4. Requirements relating to the type-approval of on-board diagnostic systems

4.1. A manufacturer may request to the authority that an OBD system be accepted for type-approval even though the system contains one or more deficiencies such that the specific requirements of this Annex are not fully met.

4.2. In considering the request, the authority shall determine whether compliance with the requirements of this Annex is infeasible or unreasonable.

The authority shall take into consideration data from the manufacturer that details such factors as, but not limited to, technical feasibility, lead time and production cycles including phase-in or phase-out of engines or vehicle designs and programmed upgrades of computers, the extent to which the resultant OBD system will be effective in complying with the requirements of this directive and that the manufacturer has demonstrated an acceptable level of effort toward compliance with the requirements of this Directive.

4.2.1. The authority will not accept any deficiency request that includes the complete lack of a required diagnostic monitor.

4.2.2. The authority will not accept any deficiency request that does not respect the OBD threshold limits in Section 3.3.2.

4.3. In determining the identified order of deficiencies, deficiencies relating to sections 3.3.3.1, 3.3.3.2 and 3.3.3.3 of this Annex for positive-ignition engines and sections 3.3.4.1, 3.3.4.2 and 3.3.4.3 of this Annex for compression-ignition engines shall be identified first.

4.4. Prior to or at the time of type-approval, no deficiency shall be granted in respect of the requirements of Section 6.5, except Section 6.5.3.4, of Appendix 1 to this Annex.

4.5. Deficiency period

4.5.1. A deficiency may be carried-over for a period of two years after the date of type-approval of the vehicle type unless it can be adequately demonstrated that substantial vehicle hardware modifications and additional lead-time beyond two years would be necessary to correct the deficiency. In such a case, the deficiency may be carried-over for a period not exceeding three years.

- 4.5.2. A manufacturer may request that the original type-approval authority grant a deficiency retrospectively when such a deficiency is discovered after the original type-approval. In this case, the deficiency may be carried over for a period of two years after the date of notification to the type-approval authority unless it can be adequately demonstrated that substantial vehicle hardware modifications and additional lead time beyond two years would be necessary to correct the deficiency. In such a case, the deficiency may be carried-over for a period not exceeding three years.
- 4.6. The authority shall notify its decision in granting a deficiency request to all authorities in other Member States according to the requirements of Article 4 to Directive 70/156/EEC.'

13. Appendix 1 is amended as follows:

- (a) The third paragraph of Section 1 is replaced by the following:

'When the vehicle is tested with the defective component or device fitted, the OBD system is approved if the MI is activated. The OBD system is also approved if the MI is activated below the OBD threshold limits.'

- (b) Section 2.1, second indent, is replaced by the following:

'— preconditioning of the vehicle with a simulated malfunction over preconditioning specified in Section 6.2.1 or Section 6.2.2.'

- (c) Section 6.3.1.5 is replaced by the following:

'6.3.1.5. Electrical disconnection of the evaporative purge control device (if equipped). For this specific failure mode, the Type I test need not be performed.'

- (d) The second paragraph of Section 6.5.1.2 is replaced by the following:

'The signals must be provided in standard units based on the specifications given in 6.5.3. Actual signals must be clearly identified separately from default value or limp-home signals.'

- (e) Section 6.5.1.5 is added as follows:

'6.5.1.5. From 1 January 2003 for new types and from 1 January 2005 for all types of vehicles entering into service, the software calibration identification number shall be made available through the serial port on the standardised data link connector. The software calibration identification number shall be provided in a standardised format.'

- (f) Sections 6.5.3.1 to 6.5.3.6 are replaced by the following:

'6.5.3.1. One of the following standards with the restrictions as described must be used as the on-board to off board communications link:

ISO 9141-2 "Road Vehicles — Diagnostic Systems — CARB Requirements for the Interchange of Digital Information";

ISO FDIS 11519-4 "Road Vehicles — Low Speed Serial Data Communication — Part 4: Class B Data Communication Interface (SAE J1850)". Emission-related messages must use the cyclic redundancy check and the three byte header and not use inter-byte separation or checksums.

ISO FDIS 14230 — Part 4 "Road Vehicles — Diagnostic Systems — Keyword Protocol 2000".

ISO WD 15765-4 "Road vehicles — Diagnostic systems Diagnostics on CAN — Part 4: Requirements for emissionrelated systems".

6.5.3.2. Test equipment and diagnostic tools needed to communicate with OBD systems must meet or exceed the functional specification given in ISO DIS 15031-4 — dated June 1998 (SAE J1978 — dated February 1998).

6.5.3.3. Basic diagnostic data, (as specified in 6.5.1) and bi-directional control information must be provided using the format and units described in ISO DIS 15031-5 — dated October 1998 (SAE J1979 — dated September 1997) and must be available using a diagnostic tool meeting the requirements of ISO DIS 15031-4 — dated June 1998 (SAE J1978 — dated February 1998).

- 6.5.3.4. When a fault is registered, the manufacturer must identify the fault using an appropriate fault code consistent with those given in Section 6.3 of ISO DIS 15031-6 — dated October 1998 (SAE J2012 — dated July 1996), relating to "Powertrain system diagnostic trouble codes" (P0 fault codes). If such identification is not possible, the manufacturer may use diagnostic trouble codes according to Sections 5.3 and 5.6 of ISO DIS 15031-6 dated October 1998 (SAE J2012 — dated July 1996) (P1 fault codes). The fault codes must be fully accessible by standardised diagnostic equipment complying with the provisions of 6.5.3.2.

The note in Section 6.3 of ISO 15031-6 (SAE J2012 — dated July 1996) immediately preceding the list of fault codes in the same section does not apply.

- 6.5.3.5. The connection interface between the vehicle and the diagnostic tester must be standardised and must meet all the requirements of ISO DIS 15031-3 — dated December 1998 (SAE J1962 — dated February 1998). The installation position must be subject to agreement of the approval authority such that it is readily accessible by service personnel but protected from accidental damage during normal conditions of use.
- 6.5.3.6. The manufacturer must also make accessible, where appropriate on payment, the technical information required for the repair or maintenance of motor vehicles unless that information is covered by an intellectual property right or constitutes essential, secret know-how which is identified in an appropriate form; in such case, the necessary technical information must not be withheld improperly.

Entitled to such information is any person engaged in commercially servicing or repairing, roadside rescuing, inspecting or testing of vehicles or in manufacturing or selling replacement or retro-fit components, diagnostic tools and test equipment.'
