II

(Preparatory Acts)

COMMISSION

Proposal for a European Parliament and Council Directive amending Council Directive 78/548/EEC on the approximation of the laws of the Member States relating to heating systems for the passenger compartment of motor vehicles

(98/C 326/04)

(Text with EEA relevance)

COM(1998) 526 final — 98/0277(COD)

(Submitted by the Commission on 28 September 1998)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 100a thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the Economic and Social Committee,

Acting in accordance with the procedure laid down in Article 189b of the Treaty,

Whereas Directive 78/548/EEC [1] is one of the separate directives of the EC type-approval procedure which has been established 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 [2], as last amended by Commission Directive 98/14/EC [3]; whereas, consequently, the provisions laid down in Directive 70/156/EEC relating to vehicle systems, components and separate technical units apply to Directive 78/548/EEC;

Whereas, in particular, under Article 3(4) and Article 4(3) of Directive 70/156/EEC each separate directive is to be accompanied by an information document incorporating the relevant items of Annex I to Directive 70/156/EEC and also a type-approval certificate based on Annex VI thereto in order that type-approval may be computerised;

Whereas, in the light of technical progress, combustion heaters, usually fuelled by diesel, petrol or liquefied petroleum gas, are now fitted to many types of vehicle in order to provide heat for the passenger compartment (e.g. of buses), the load area (e.g. of trucks and trailers) or the sleeping compartment (e.g. of trucks and motor caravans) so that heat can be provided efficiently and without the noise and gaseous emissions associated with running the propulsion engine when the vehicle is parked; whereas, for reasons of safety, it is necessary to extend the scope of Directive 78/548/EEC to include requirements for combustion heaters, and for their installation; whereas such requirements should be representative of the highest standards consistent with current technology;

Whereas it is necessary to provide for type-approval for combustion heaters as components and for vehicles in which a combustion heater is installed;

Whereas in this Directive account should be taken of the other provisions which exist or are in preparation with respect to the safety and installation of gas and liquid fuel combustion heaters, and in particular Council Directive 90/396/EEC [4], as amended by Directive 93/68/EEC [5], with regard to the safety of gas appliances, European Norm prEN 1949 (November 1995) on a specification for the installation of LPG systems for habitation purposes in leisure accomodation vehicles and other vehicles and European Norm prEN 722-1 (November 1995) on liquid fuel heating systems for caravans and mobile homes,

[1] OJ L 168, 26.6.1978, p. 40.
[2] OJ L 42, 23.2.1970, p. 1.
[3] OJ L 91, 25.3.1998, p. 1.
[4] OJ L 196, 26.7.1990, p. 15.
[5] OJ L 220, 30.8.1993, p. 1.

HAS ADOPTED THIS DIRECTIVE:

Article 1

Directive 78/548/EEC is amended as follows:

1. The title is replaced by the following:

'Council Directive 78/548/EEC of 12 June 1978 relating to heating systems for motor vehicles and their trailers.'

2. Articles 1, 2 and 3 are replaced by the following:

'*Article 1*

For the purposes of this Directive, "vehicle" means any vehicle to which Directive 70/156/EEC applies.

Article 2

No Member State may refuse to grant EC type-approval or national type-approval of a type of vehicle or of a type of heating system on grounds relating to the heating system for the passenger compartment or load area if the system satisfies the requirements of the Annexes.

Article 3

No Member State may refuse or prohibit the sale, registration, entry into service or use of any vehicle or the sale, entry into service or use of any heating system on grounds relating to the heating system for the passenger compartment or load area if the system satisfies the requirements of the Annexes.'

3. The Annexes are replaced by the text in the Annex to this Directive.

Article 2

1. With effect from 1 October 1999 Member States may not, on grounds relating to heating systems:

— refuse, in respect of a type of vehicle or heating system, to grant EC type-approval or national type-approval, or

— prohibit the registration, sale or entry into service of vehicles, or the sale or entry into service of heating systems,

if the heating system complies with the requirements of Directive 78/548/EEC, as amended by this Directive.

2. With effect from 1 October 2000 Member States:

— shall no longer grant EC type-approval, and

— may refuse to grant national type-approval,

for a type of vehicle on grounds relating to heating systems, of for a type of combustion heater, if the requirements of Directive 78/548/EEC, as amended by this Directive, are not fulfilled.

3. With effect from 1 October 2001 Member States:

— shall consider certificates of conformity which accompany new vehicles in accordance with the provisions of Directive 70/156/EEC to be no longer valid for the purposes of Article 7(1) of that Directive, and

— may refuse the registration, sale and entry into service of new vehicles,

on grounds relating to heating systems if the requirements of Directive 78/548/EEC, as amended by this Directive, are not fulfilled.

This paragraph shall not apply to vehicle types equipped with a waste-heat heating system — using water as the transfer medium.

4. With effect from 1 October 2001 the requirements of Directive 78/548/EEC relating to combustion heaters as components, as amended by this Directive, are applicable for the purposes of Article 7(2) of Directive 70/156/EEC.

Article 3

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 30 September 1999. 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 text of the main provisions of national law which they adopt in the field covered by this Directive.

Article 4

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

Article 5

This Directive is addressed to the Member States.

ANNEX

'*ANNEX I*

ADMINISTRATIVE PROVISIONS FOR TYPE-APPROVAL

1. **Application for EC type-approval of a vehicle type**

1.1. The application for EC type-approval pursuant to Article 3(4) of Directive 70/156/EEC of a vehicle type with regard to its heating system shall be submitted by the manufacturer.

1.2. A model for the information document is given in Appendix 1.

1.3. The following must be submitted to the technical service responsible for conducting the type-approval tests:

1.3.1. a vehicle representative of the type to be approved.

2. **Granting of EC type-approval of a vehicle type**

2.1. If the relevant requirements are satisfied, EC type-approval pursuant to Article 4(3) of Directive 70/156/EEC shall be granted.

2.2. A model for the EC type-approval certificate is given in Appendix 2.

2.3. 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.

3. **Application for EC type-approval of a type of combustion heater**

3.1. The application for EC type-approval pursuant to Article 3(4) of Directive 70/156/EEC of a type of combustion heater as a component shall be submitted by the manufacturer of the heating system.

3.2. A model for the information document is given in Appendix 3.

3.3. The following must be submitted to the technical service responsible for conducting the type-approval tests:

3.3.1. a combustion heater representative of the type to be approved.

4. **Granting of EC type-approval of a type of combustion heater**

4.1. If the relevant requirements are satisfied, EC type-approval pursuant to Article 4(3) and, if applicable, Article 4(4) of Directive 70/156/EEC shall be granted.

4.2. A model for the EC type-approval certificate is given in Appendix 4.

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

4.4. Every combustion heater conforming to a type approved pursuant to this Directive shall bear an EC component type-approval mark as specified in Appendix 5.

5. **Modifications of the type and amendments to approvals**

5.1. In the case of modifications of the type of vehicle or type of combustion heater approved pursuant to this Directive, the provisions of Article 5 of Directive 70/156/EEC shall apply.

6. **Conformity of production**

6.1. Measures to ensure the conformity of production shall be taken in accordance with the provisions laid down in Article 10 of Directive 70/156/EEC.

Appendix 1

Information document No . . .

in accordance with Annex I to Council Directive 70/156/EEC (1) relating to EC type-approval of a vehicle with regard to its heating systems (2)

(Directive 78/548/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:

0.2.1. Commercial name(s) if available:

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:

3. **Power plant (q)**

3.1.1. Manufacturer's engine code (as marked on the engine, or other means of identification):

3.2.1.1. Working principle: positive ignition/compression ignition, four stroke/two stroke (3)

3.2.1.2. Number and arrangement of cylinders:

3.2.1.8. Maximum net power: ..... kW at ..... min^{-1} (manufacturer's declared value)

3.2.7. Cooling system (liquid/air) (3)

3.2.7.1. Nominal setting of the engine temperature control mechanism:

3.2.8.1. Pressure charger: yes/no (3)

3.2.8.1.2. Type(s):

(1) 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.

(2) In the case of heating systems using heat from the engine cooling fluid, only items 0 to 0.8, 3.2.7 and 9.10.5.1 are applicable.

(3) Delete where not applicable.

3.2.8.1.3. Description of the system (e.g. maximum charge pressure: ..... kPa, wastegate if applicable)

9. **Bodywork**

9.10.5. Heating systems for the passenger compartment

9.10.5.1. A brief description of the vehicle type with regard to the heating system if the heating system uses the heat of the engine cooling fluid:

9.10.5.2. A brief description of the vehicle type with regard to the heating system if the cooling air or the exhaust gases of the engine are used as the heat source, including

9.10.5.2.1. Layout drawing of the heating system showing its position in the vehicle:

9.10.5.2.2. Layout drawing of the heat exchanger for heating systems using the exhaust gases for heating or of the parts where the heat exchange takes place (for heating systems using the engine cooling air for heating):

9.10.5.2.3. Sectional drawing of the heat exchanger or the parts respectively where the heat exchange takes place, indicating the thickness of the wall, materials used and the characteristics of the surface:

9.10.5.2.4. Specifications shall be given for further important components of the heating system, such as e.g. the heater fan, with regard to their method of construction and technical data:

Appendix 2

MODEL

(maximum format: A4 (210 × 297 mm))

EC TYPE-APPROVAL CERTIFICATE

STAMP OF ADMINISTRATION

Communication concerning the

— type-approval (1)

— extension of type-approval (1)

— refusal of type-approval (1)

— withdrawal of type-approval (1)

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

Type-approval number: .....

Reason for extension: .....

SECTION I

0.1. Make (trade name of manufacturer):

0.2. Type:

0.2.1. Commercial name(s), if available:

0.3. Means of identification of type if marked on the vehicle/component/separate technical unit (1) (2):

0.4. Category of vehicle (1) (3):

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 EC 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:

(1) Delete where not applicable.

(2) 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 documentation by the symbol "?" (e. g. ABC??123??).

(3) As defined in Annex IIA to Directive 70/156/EEC.

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.

Addendum

to EC type-approval certificate No ... concerning the type-approval of a type of vehicle with regard to Directive 78/548/EEC as last amended by Directive .../.../EC

1. Additional information

1.1. Heating system using heat from the engine cooling fluid/exhaust gases/engine cooling air (1)

1.2. Combustion heaters, if any

5. Remarks:

(1) Delete where not applicable.

Appendix 3

Information document No . . .

relating to EC component type-approval of a combustion heater (Directive 78/548/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):

0.5. Name and address of manufacturer:

0.7. In the case of components and separate technical units, location and method of affixing of the EC type-approval mark:

0.8. Address(es) of assembly plant(s):

1. **Combustion heater**

1.1. Test pressure:

1.2. etc.

Appendix 4

MODEL

(maximum format: A4 (210 × 297 mm))

EC TYPE-APPROVAL CERTIFICATE

STAMP OF ADMINISTRATION

Communication concerning the

— type-approval (1)

— extension of type-approval (1)

— refusal of type-approval (1)

— withdrawal of type-approval (1)

of a type of vehicle/component/separate technical unit (1) with regard to Directive .../.../EEC, 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 (1) (2):

0.4. Category of vehicle (1) (3):

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 EC 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:

(1) Delete where not appropriate.

(2) 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 documentation by the symbol "?" (e.g. ABC??123??).

(3) As defined in Annex IIA to Directive 70/156/EEC.

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.

Addendum

to EC type-approval certificate No ... concerning the component type-approval of a type of combustion heater with regard to Directive 78/548/EC as last amended by Directive .../.../EC

1. Additional information

1.1. Description of the type of combustion heater:

etc.

5. Remarks:

Appendix 5

EC COMPONENT TYPE-APPROVAL MARK

1. **General**

1.1. The EC component type-approval mark consists of:

1.1.1. a rectangle surrounding the lower case letter "e" followed by the distinguishing number or letters of the Member State which has granted the EC component type-approval:

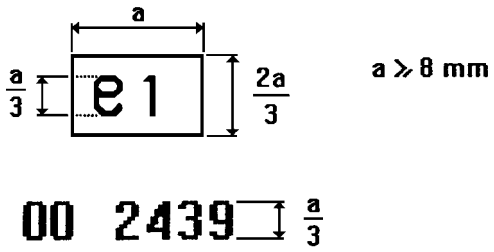
1	for Germany	12	for Austria
2	for France	13	for Luxembourg
3	for Italy	17	for Finland
4	for the Netherlands	18	for Denmark
5	for Sweden	21	for Portugal
6	for Belgium	23	for Greece
9	for Spain	IRL	for Ireland
11	for the United Kingdom		

1.1.2. in the vicinity of the rectangle the "base approval number" contained in section 4 of the type approval number referred to in Annex VII to Directive 70/156/EEC, preceded by the two figures indicating the sequence number assigned to the most recent major technical amendment to Directive 78/548/EEC on the date EC component type-approval was granted. In this Directive, the sequence number is 00.

1.2. The EC component type-approval mark must be clearly legible and indelible.

2. **Example of the EC component type-approval mark**

2.1.



The above component type-approval mark shows that the combustion heater in question has been approved in Germany (e 1) under approval number 2439. The first two digits (00) indicate that this component was approved according to this Directive.

ANNEX II

SCOPE, DEFINITIONS AND REQUIREMENTS

1. **Scope**

1.1. This Directive applies to all vehicles in categories M, N and O where a heating system is fitted.

2. **Definitions**

For the purposes of this Directive:

2.1. "*heating system*" means any type of device which is designed to increase the temperature of the interior of a vehicle, including any load area;

2.2. "*combustion heater*" means a device directly using liquid or gaseous fuel and not using the waste heat from the engine used for propulsion of the vehicle;

2.3. "*vehicle type with regard to heating system*" means vehicles which do not differ in essential respects such as:

— functioning principle(s) of the heating system,

— type of combustion heater, if any;

2.4. "*type of combustion heater*" means devices which do not differ in essential respects such as:

— fuel type (e.g. liquid or gaseous),

— transfer medium (e.g. air or water),

— vehicle location (e.g. passenger compartment or load area);

2.5. "*waste-heat heating system*" means any type of device using the waste heat from the engine used for propulsion of the vehicle to increase the temperature of the interior of the vehicle, this may include water, oil or air as the transfer medium;

2.6. "*interior*" means the inside of a vehicle used for the accommodation of the vehicle occupants and/or the load;

2.7. "*heating system for the passenger compartment*" means any type of device designed to increase the temperature of the passenger compartment;

2.8. "*heating system for the load area*" means any type of device designed to increase the temperature of the load area;

2.9. "*passenger compartment*" means the interior part of the vehicle used to accommodate the driver and any passengers;

2.10. "*gaseous fuel*" includes fuels that are gaseous at normal temperature and pressure, such as liquefied petroleum gas (LPG) and compressed natural gas (CNG);

2.11. "*overheating*" means the condition that exists when the air inlet to the combustion heater is completely blocked.

3. **Requirements for heating systems**

3.1. The passenger compartment of every vehicle in categories M and N shall be fitted with a heating system.

3.2. The general requirements for heating systems are that:

— the heated air entering the passenger compartment shall be no more polluted than the air at the point of inlet to the vehicle,

— the driver of the vehicle, during road use, will not be able to come into contact with parts of the vehicle or heated air liable to cause burns, and

— the exhaust emissions from combustion heaters are within acceptable limits.

The test procedures for the verification of each of these requirements are set out in Annexes IV, V and VI.

3.2.1. The following table indicates which Annexes apply to each type of heating system within each vehicle category:

Heating system	Vehicle category	Annex IV Air quality	Annex V Temperature	Annex VI Exhaust
Engine waste heat — water	M			
	N			
	O			
Engine waste heat — air	M	1	1	
	N	1	1	
See Note 1	O			
Engine waste heat — oil	M	1	1	
	N	1	1	
	O			
Gaseous fuel heater	M	1	1	1
	N	1	1	1
See Notes 2 and 4	O			1
Liquid fuel heater	M	1	1	1
See Note 4 (Categories M and N)	N	1	1	1
See Note 3 (Category O)	O			1

3.3. Other requirements for combustion heaters and their installation in vehicles are laid down in Annex VII.

Note 1: Vehicles which comply with the requirements of Annex III are exempt from these test requirements.

Note 2: Combustion heaters designed for use when the vehicle is in motion and which comply with Directive 90/396/EEC and installed according to EN 1949, are deemed to comply with Annexes IV, V and VI (except for paragraph 3).

Note 3: Combustion heaters which comply with EN 722-1 (date) are deemed to comply with Annexes IV, V and VI.

Note 4: Combustion heaters located outside the passenger compartment, using water as a transfer medium, are deemed to comply with Annexes IV and V.

ANNEX III

REQUIREMENTS FOR WASTE HEATING SYSTEMS — AIR

1. The requirements set out in 3.2 of Annex II are considered satisfied in respect of heating systems which include a heat exchanger, the primary circuit of which is passed over by exhaust gases or polluted air, provided that the following conditions are satisfied:

2. the walls of the primary circuit of the heat exchanger must be leak-tight at any pressure up to and including 2 bar;

3. the walls of the primary circuit of the heat exchanger must not include any detachable component;

4. the wall of the heat exchanger where the exchange of heat takes place must be at least 2 mm thick if made of non-alloy steels;

4.1. in cases where other materials are used (including composite or coated materials), the thickness of the wall must be such as to ensure that the heat exchanger has the same service life as in the case referred to in 4;

4.2. if the wall of the heat exchanger where the exchange of heat takes place is enamelled, the wall where such enamel has been applied must be at least 1 mm thick and this enamel must be durable, leak tight and not porous;

5. the pipe conducting the exhaust gases must include a corrosion test zone at least 30 mm long, this zone being situated directly downstream of the heat exchanger, uncovered and easily accessible;

5.1. the wall of this corrosion test zone must not be thicker than the pipes for the exhaust gases situated inside the heat exchanger and the materials and surface properties of this section must be comparable with those of these pipes;

5.2. if the heat exchanger forms a single unit with the vehicle exhaust silencer, the external wall of the latter must be regarded as the zone complying with 5.1 where any corrosion should occur.

6. In the case of waste-heat heating systems using the cooling air of the engine for heating purposes, the conditions of 3.2 of Annex II are considered satisfied without the use of a heat exchanger provided that the following conditions are satisfied:

— the cooling air which is used for heating purposes comes into contact only with surfaces of the engine which do not include any detachable part, and

— the connections beween the walls of this cooling air circuit and the surfaces used for the transfer of heat are gas-tight and oil-resistant.

These conditions are considered satisfied if, for example:

6.1. a sheath around each sparking plug draws off any gas leaks outside the heating air circuit;

6.2. the joint between the cylinder head and the exhaust manifold is situated outside the heating air circuit;

6.3. there is double leak protection between the cylinder head and the cylinder and any leaks from the first joint are drawn off outside the heating air circuit,

or

the leak protection between the cylinder head and the cylinder still holds when the cylinder head nuts are cold-tightened at one-third of the nominal torque prescribed by the manufacturer,

or

the area where the cylinder head is joined to the cylinder is situated outside the heating air circuit.

ANNEX IV

TEST PROCEDURE FOR AIR QUALITY

1.0. In the case of complete vehicles the following test shall be carried out:

1.1. Operate the heater for one hour at maximum output in conditions of still air (wind speed $\leq$ 2 m/s), with all windows closed and, in the case of a combustion heater, the propulsion engine switched off. If, however, having selected the maximum output the heater switches off automatically in less than an hour, the measurements may be made earlier.

1.2. The proportion of CO in the ambient air shall be measured by taking samples from:

(a) a point outside the vehicle as close as possible to the heating air inlet; and

(b) a point inside the vehicle less than 1 m from the heated air outlet.

1.3. Readings shall be taken for a representative time of 10 minutes.

1.4. The reading from position (b) shall be less than 20 ppm CO higher than from position (a).

2.0. In the case of combustion heaters as components the following test shall be carried out:

2.1. The primary circuit of the heat exchanger shall be subjected to a leakage test to ensure that polluted air cannot enter the heated air intended for the passenger compartment.

2.2. The requirement shall be considered to be fulfilled if, at a gauge pressure of Δ 500 hpa, the leakage rate from the heat exchanger is $\leq$ 30 dm^3/h.

ANNEX V

TEST PROCEDURE FOR TEMPERATURE

1. Operate the heater for one hour at maximum output in conditions of still air (wind speed $\leq$ 2 m/s), with all windows closed. If, however, having selected the maximum output the heater switches off automatically in less than an hour, the measurements may be made earlier. If the heated air is drawn from outside the vehicle the test shall be carried out at an ambient temperature of not less than 15 °C.

2. The surface temperature of any part of the heating system likely to come into contact with the driver of the vehicle during normal road use shall be measured with a contact thermometer. No such part or parts shall exceed a temperature of 80 °C.

2.1. In the case of part or parts of the heating system behind the driver's seat, and in the case of overheating, the temperature shall not exceed 110 °C.

3.1. In the case of vehicles of categories M_1 and N, no part of the system likely to come into contact with seated passengers during normal road use of the vehicle, with the exception of the outlet grille, shall exceed a temperature of 110 °C.

3.2. In the case of vehicles of categories M_2 and M_3, no part of the system likely to come into contact with passengers during normal road use of the vehicle, shall exceed a temperature of 80 °C.

4. The temperature of the heated air entering the passenger compartment shall not exceed 150 °C to be measured at the centre of the outlet.

ANNEX VI

TEST PROCEDURE FOR EXHAUST EMISSIONS

1. Operate heater for one hour at maximum output in conditions of still air (wind speed ≤ 2 m/s) and an ambient temperature of 20 ± 10 °C. If, however, having selected the maximum output the heater switches off automatically in less than an hour, the measurements may be made earlier.

2. The dry and undiluted exhaust emissions, measured using an appropriate meter, shall not exceed the values indicated in the following table:

Parameter	Gas heaters	Liquid fuel heaters
CO	≤ 0,1 % vol.	≤ 0,1 % vol.
NO_x	≤ 200 ppm	≤ 200 ppm
HC	≤ 100 ppm	≤ 100 ppm
Absorption coefficient (1)	≤ 1	≤ 6

(1) Reference unit "Bacharach" ASTM D 2156 is used.

3. The test shall be repeated in conditions equivalent to a vehicle speed of 100 km/h. Under these conditions the CO value must not exceed 0,2 % vol. If the test has been carried out on the heater as a component, then it need not be repeated in the case of the vehicle type in which the heater is installed.

ANNEX VII

REQUIREMENTS FOR COMBUSTION HEATERS

1. GENERAL REQUIREMENTS

1.1. Operating and maintenance instructions shall be supplied with every heater and, in the case of heaters intended for the after-market, installation instructions shall also be supplied.

1.2. Safety equipment shall be installed (either as part of the combustion heater or as part of the vehicle) to control the operation of every combustion heater in an emergency. It shall be designed such that, if no flame is obtained at start-up or if the flame goes out during operation, the ignition and switching times for the supply of fuel are not exceeded by 4 minutes in the case of liquid fuel heaters or 1 minute in the case of gaseous fuel heaters.

1.3. The combustion chamber and the heat exchanger shall be capable of withstanding a pressure of twice the normal operating pressure or 2 bar (gauge), whichever is greater. The test pressure shall be noted in the information document.

1.4. The heater must have a maker's label showing the maker's name, the model number and type together with its rated output in kilowatts. The fuel type must also be stated and, where relevant, the operating voltage and gas pressure.

2. VEHICLE INSTALLATION REQUIREMENTS

2.1. **Scope**

2.1.1. Subject to 2.1.2 and 2.1.3, combustion heaters shall be installed according to the requirements of this Annex.

2.1.2. Vehicles having gaseous fuel heaters which are installed according to European Norm EN 1949 (date) are deemed to comply with the requirements of this Annex.

2.1.3. Vehicles of category O having liquid fuel heaters which are installed according to the requirements set out in European Norms EN 722-1 (date) are deemed to comply with the requirements of this Annex.

2.2. **Positioning of heater**

2.2.1. Body sections and any other components in the vicinity of the heater must be protected from excessive heat and the possibility of fuel or oil contamination.

2.2.2. The combustion heater shall not constitute a risk of fire, even in the case of overheating. This requirement shall be deemed to be fulfilled if the installation ensures an adequate distance to all parts and suitable ventilation, by the use of fire-resistant materials or by the use of heat shields.

2.2.3. In the case of M_2 and M_3 vehicles, the heater must not be positioned in the passenger compartment. However an installation in an effectively sealed envelope which also complies with the conditions in 2.2.2 may be used.

2.2.4. The label referred to in 1.4, or a duplicate, must be positioned so that it can be easily read when the heater is installed in the vehicle.

2.2.5. Every reasonable precaution should be taken in positioning the heater to minimise the risk of injury and damage to personal property.

2.3. **Fuel supply**

2.3.1. The fuel filter must not be situated in the passenger compartment and must be provided with an effective cap to prevent fuel spillage.

2.3.2. In the case of liquid fuel heaters, where a supply separate to that of the vehicle is provided, the type of fuel and its filler point must be clearly labelled.

2.3.3. A notice, indicating that the heater must be shut down before refuelling, shall be affixed if possible to the fuelling point or a suitable instruction included in the manufacturer's operating manual.

2.4. **Exhaust system**

2.4.1. The exhaust outlet shall be located to prevent emissions from entering the vehicle through ventilators, heated air inlets or opening windows.

2.5. **Combustion air inlet**

2.5.1. The air for the combustion chamber of the heater must not be drawn from the passenger compartment of the vehicle.

2.5.2. The air inlet must be so positioned or guarded that blocking by rubbish or luggage is unlikely.

2.6. **Heating air inlet**

2.6.1. The heating air supply may be fresh or recirculated air and must be drawn from a clean area not likely to be contaminated by exhaust fumes emitted either by the propulsion engine, the combustion heater or any other vehicle source.

2.6.2. The inlet duct must be protected by mesh or other suitable means.

2.7. **Heating air outlet**

2.7.1. Any ducting used to route the hot air through the vehicle must be so positioned or protected that no injury or damage could be caused if it were to be touched.

2.7.2. The air outlet must be so positioned or guarded that blocking by rubbish or luggage is unlikely.'