COMMISSION OF THE EUROPEAN COMMUNITIES

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Proposal for a

EUROPEAN PARLIAMENT AND COUNCIL DIRECTIVE

on action to be taken against the emission of gaseous and particulate pollutants by engines intended to power agricultural or forestry tractors and amending Council Directive 74/150/EEC

(presented by the Commission)

EXPLANATORY MEMORANDUM

Road traffic has long been recognized as being a major source of air pollution by substances such as carbon monoxide (CO), unburned hydrocarbons (HC), nitrogen oxides (Nox) and particulates (PT). Recent Commission studies show fairly clearly that emissions from mobile machinery, essentially operating off the road, and agricultural or forestry tractors, are also significant.

The first European measures in this area were intended to reduce road-vehicle emissions in successive stages. More recently Parliament and the Council adopted Directive 97/68/EC, which applies to off-road mobile machinery, in order also to reduce the emissions by this in stages. The sixth recital of that Directive states that emissions control legislation on agricultural and forestry tractors with requirements analogous to those laid down for off-road mobile machinery so as to ensure an equivalent level of environmental protection should also be introduced as soon as possible.

This proposal covers those requirements. They concern, in particular, the definition of the component type-approval procedures applying to engines intended to be fitted to tractors and thus also the definition of the type-approval procedures for such vehicles in terms of their pollutant emissions.

At the request of the Member States and interested circles it was agreed, in order to achieve economic consistency and industrial logic, to adopt for the component type-approval of engines and the type-approval of tractors the same test requirements as have been adopted for off-road mobile machinery, together with the corresponding limit values for the emission levels.

In addition, the equivalence between the technical requirements set out in this proposal concerning stage 1 and those of UN/ECE Regulation No 96 is recognized with that same industrial logic in mind in order to make it easier to enter third-country markets. Finally, in order to add flexibility to the engine market it is planned, for the first stage, also to recognize the technical requirements set out in Council Directive 88/77/EEC concerning emissions by diesel engines for use in vehicles.

The European type-approval of tractors that has gradually been built up since 1974 is based on framework Directive 74/150/EEC, as last amended by Directive 97/54/EC, and on 22 separate directives. The aim is to create a single approval system that guarantees free movement within the Union.

For the moment implementation of the Directives and full-vehicle approval remain optional. Each manufacturer may thus decide freely whether to use them or not. However, where a choice is made to certify either an engine that is intended to power tractors or else a tractor in accordance with those Directives, the Member States are required to authorize the free movement of these.

Those 22 separate Directives include Council Directive 77/537/EEC relating to the measures to be taken against the emission of pollutants from diesel engines for use in tractors, but which only deals with the opacity of the exhaust gases. This proposal supplements that Directive 77/537/EEC by drawing a distinction between the four pollutant chemical components (CO, Nox , HC and PT). It is therefore necessary to amend framework Directive 74/150/EEC in order to add a further heading to Annex II which mentions the subject covered by this proposal, together with the code SD (separate Directive.).

Proposal for a

EUROPEAN PARLIAMENT AND COUNCIL DIRECTIVE

on action to be taken against the emission of gaseous and particulate pollutants by engines intended to power agricultural or forestry tractors and amending Council Directive 74/150/EEC

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[1],

Having regard to the opinion of the Economic and Social Committee[2],

Acting in accordance with the procedure laid down in Article 189b of the Treaty[3],

1. Whereas, to ensure the proper functioning of the internal market, Directive 74/150/EEC of 4 March 1974 on the approximation of the laws of the Member States relating to the type-approval of wheeled agricultural or forestry tractors[4], as last amended by European Parliament and Council Directive 97/54/EC[5] and the 22 separate Directives adopted between 1974 and 1989 harmonized the technical specifications in this field;

2. Whereas, in order to further safeguard the environment, it is necessary to supplement the measures already adopted, as regards the opacity of exhaust gases, by Council Directive 77/537/EEC of 28 June 1977 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of pollutants from diesel engines for use in wheeled agricultural or forestry tractors[6], as last amended by Directive 97/54/EC, by adding measures relating, in particular, to physico-chemical emissions; whereas, by referring to the provisions of European Parliament and Council Directive 97/68/EC of 16 December 1997 on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery[7], this Directive should lay down the limit values for emissions of gaseous and particulate

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1 OJ C

2 OJ C

3 Opinion of the European Parliament of ..... (OJ C ...), Council common position of ..... and decision of the European Parliament of ..... .

4 OJ L 84, 28.3.1974, p.10.

5 OJ L 277, 10.10.1997, p. 24.

6 OJ L 220, 29.8.1977, p.38.

7 OJ L 59, 27.2.1998, p. 1.

pollutants to be applied in successive stages, and the test procedure for internal combustion engines intended to power agricultural or forestry tractors; whereas compliance with the provisions of Council Directive 88/77/EEC of 3 December 1987 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous pollutants from diesel engines for use in vehicles[8], as last amended by European Parliament and Council Directive 96/1/EC[9], can also be accepted on the same basis as compliance with the requirements of this Directive;

3. Whereas, in order to facilitate access to third-country markets, it is necessary to establish equivalence between the requirements of this Directive for the first stage and the requirements laid down in United Nations Economic Commission for Europe (UN/ECE) Regulation No 96 concerning the component type-approval of compression ignition engines intended to be fitted to agricultural or forestry tractors in terms of their pollutant emissions[10];

4. Whereas, in order to maximize the benefits to the European environment and, at the same time, to ensure the unity of the market, it is necessary to adopt very strict mandatory standards at regular intervals; whereas any further reduction in the limit values and any changes to the test procedure can be adopted only on the basis of studies and research to be conducted into existing and foreseeable technological potential and into the cost-effectiveness of the options, in order to allow production on an industrial scale of agricultural or forestry tractors that are capable of meeting these more stringent limits; whereas the decision regarding any such subsequent reduction should be taken by Parliament and the Council by the end of 2006;

5. Whereas the Member States should be allowed to grant fiscal incentives to promote the introduction of engines intended to be fitted to agricultural or forestry tractors which meet in advance the requirements adopted at Community level concerning action to counter pollutant emissions;

6. Whereas, in accordance with the principles of subsidiarity and proportionality as set out in Article 3b of the Treaty, the objectives of the Community measures envisaged by this Directive cannot be sufficiently achieved by the Member States and can therefore be better achieved by the Community; whereas this Directive confines itself to the minimum required in order to achieve those objectives and does not go beyond what is necessary for that purpose;

7. Whereas technical progress requires rapid adaptation of the technical requirements set out in the Annexes to this Directive; whereas, with the exception of the limit values for pollutants, it is appropriate to delegate this task to the Commission, with the aim of simplifying and accelerating the procedure; whereas, wherever Parliament and the Council empower the Commission to implement the rules drawn up for agricultural or forestry tractors, a prior consultation procedure should

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8 OJ L 36, 9.2.1988, p. 33.

9 OJ L 40, 17.2.1996, p. 1.

10 Doc. E/ECE/TRANS/505/Rev. 1/Add. 95.

be introduced whereby the Commission and the Member States meet within the committee established by Directive 74/150/EEC;

8. Whereas the requirements of this Directive supplement those of Council Directive 77/537/EEC, which is referred to in Annex II to Directive 74/150/EEC; whereas Directive 74/150/EEC thus needs to be amended,

HAVE ADOPTED THIS DIRECTIVE:

Article 1

For the purposes of this Directive:

- "agricultural or forestry tractor" (hereinafter referred to as "tractor") means any vehicle as defined in Article 1(1) of Directive 74/150/EEC;

- "engine" means any internal combustion engine intended to power tractors, as defined in Annex I to this Directive;

- "component type-approval of an engine type or family in respect of pollutant emissions" means the instrument whereby a Member State certifies that an engine type or family intended to power tractors meets the technical requirements of this Directive;

- "type-approval of a tractor type in respect of pollutant emissions" means the instrument whereby a Member State certifies that a tractor type equipped with an engine as defined in Annex I meets the technical requirements of this Directive;

- "family of engines" means two or more types of engine that are similar in design and which, therefore, could display characteristics that are comparable in terms of pollutant emissions.

Article 2

The procedure for granting component type-approval for an engine type or family in respect of pollutant emissions, the procedure for granting type-approval for tractors in respect of pollutant emissions, and the conditions for the unrestricted placing on the market of such engines and tractors, shall be as laid down in Directive 74/150/EEC.

Article 3

1. Any engine type or family shall meet the requirements of Annex I in respect of pollutant emissions.

2. Any tractor type shall meet the requirements of Annex II in respect of pollutant emissions.

Article 4

1. As from 1 January 2001, Member States may not:

   - refuse to grant EC component type-approval or national component type-approval in respect of an engine type or family, or

   - prohibit the sale of such engines,

   if the pollutants emitted by those engines meet the requirements of this Directive, or

   - refuse to grant EC type-approval or national type-approval of tractors, or

   - prohibit the initial entry into service of tractors,

   if the pollutants emitted by the engine fitted to those tractors meet the requirements of this Directive.

2. As from 1 October 2001, Member States:

   - may no longer grant EC type-approval for a tractor type,

   - shall refuse to grant national type-approval for a tractor type,

   where the pollutants emitted by the engine fitted to that tractor type do not meet the requirements of this Directive.

3. As from 1 October 2003, Member States shall prohibit the initial entry into service of tractors where the pollutants emitted by their engines do not meet the requirements of this Directive.

Article 5

The authorities of Member States granting EC component type-approval for a type or family of engines or EC type-approval for a type of tractor shall recognize the component type-approvals or type-approvals granted in accordance with the provisions of section 3 of Annex I and section 3 of Annex II and the corresponding component type-approval or type-approval marks.

Article 6

On the basis of a proposal which the Commission shall, if need be, put forward by the end of 2004, the European Parliament and the Council shall decide on a further reduction in emission limit values by the end of 2006. In its proposal, drawn up on the basis of research and cost/efficiency assessments of the application of more stringent limit values, the Commission will propose measures that are proportional and reasonable with regard to the targets set, taking account of the overall availability of techniques for controlling

air-polluting emissions from engines and the incorporation of new engine systems and accessories into tractors, and of the air-quality situation.

Article 7

1. Member States may provide tax incentives for tractors and engines that are intended to power such tractors only where they comply with the anti-pollution measures laid down in this Directive.

2. The incentives referred to in paragraph 1 shall comply with the provisions of the Treaty and fulfil the following conditions:

   - they shall be valid for all new tractors and engines sold on the market of a Member State which meet the requirements of this Directive in advance;

   - they shall end with the mandatory application of the limit values laid down in this Directive;

   - they shall, for each type of tractor and engine, be lower than the extra cost of the technical solutions introduced and of fitting the engine to the tractor in such a way that the values laid down are not exceeded.

3. The Commission shall be informed of any plans to introduce or change any of the tax incentives referred to in the first paragraph sufficiently early for it to comment thereon.

Article 8

Any amendments needed in order to adapt the requirements of the Annexes to technical progress shall be adopted in accordance with the procedure laid down in Article 13 of Directive 74/150/EEC.

Article 9

In Annex II to Directive 74/150/EEC, the following item 2.8.2 is inserted:

"2.8.2. Emissions of gaseous pollutants and particulate pollutants by engines: SD".

Article 10

Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 31 December 2000. They shall forthwith inform the Commission thereof.

They shall apply these provisions from 1 October 2001.

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.

Article 11

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

Article 12

This Directive is addressed to the Member States.

Done at Brussels,

For the European Parliament
The President

For the Council
The President

ANNEX I

REQUIREMENTS FOR THE EC COMPONENT TYPE-APPROVAL OF A TRACTOR ENGINE TYPE OR FAMILY IN TERMS OF THE POLLUTANTS EMITTED

1. DEFINITIONS

1.1 Type of tractor engine in terms of the pollutants emitted.
"Type of tractor engine in terms of the pollutants emitted" means compression ignition engines which display no essential differences with regard to the characteristics defined in Appendix 1 to this Annex.

1.2 Pollutants emitted
"Pollutants emitted" means gaseous pollutants (carbon monoxide, hydrocarbons, and nitrogen oxides) and polluting particulates.

2. REQUEST FOR COMPONENT TYPE-APPROVAL

2.1 Any request for the component type-approval of an engine type or family in terms of the pollutants emitted shall be made by the manufacturer or his agent.

2.2 It shall be accompanied by the information document, completed in triplicate, a specimen for which is provided in Appendix 1.

3. TEST REQUIREMENTS

3.1. The test requirements and limit values set out in Directive 97/68/EC, as in force on the date of entry into force of this Directive, must be met.

Alternatively, until the end of the first stage laid down in Directive 97/68/EC, the following shall also be accepted:

3.1.1. the test requirements and limit values set out in Directive 88/77/EEC;

3.1.2. the test requirements and limit values set out in United Nations Economic Commission for Europe Regulation No 96.

4. COMPONENT TYPE-APPROVAL

An EC type-approval certificate conforming to the specimen provided in Appendix 2 to this Annex shall be issued.

5. ENGINE MARKING

5.1 The engine shall be marked in accordance with the requirements of Appendix 3 to this Annex. The identification number must comply with the provisions of Appendix 4 to this Annex.

5.2 The marks and identification as required by Directive 97/68/EC and by United Nations ECE Regulation No 96 shall also be accepted.

6. CONFORMITY OF PRODUCTION

6.1 Without prejudice to the requirements of Article 8 of Directive 74/150/EEC, conformity of production shall be checked in accordance with the provisions of section 5 of Annex I to Directive 97/68/EC, or, where applicable, in accordance with section 8 of Annex I to Directive 88/77/EEC and on the basis of the description given in the EC component type-approval certificate in Appendix 2 to this Annex.

ANNEX I
APPENDIX 1

INFORMATION DOCUMENT

CONCERNING THE EC COMPONENT TYPE-APPROVAL OF A TRACTOR ENGINE TYPE OR FAMILY, IN TERMS OF THE POLLUTANTS EMITTED

The information set out below shall, where appropriate, be supplied in triplicate and be accompanied by a list of enclosures. Any drawings needed shall be supplied to an appropriate scale and with sufficient details in A4 format or in a folder of this format. Photographs shall, where needed, show sufficient detail.

SECTION 1 GENERAL

1. ENGINE TYPE/PARENT ENGINE OF THE FAMILY[1,3]

1.1 Make (name of manufacturer): .....
1.2 Type and trade description(s) of the engine or, where appropriate, of the family's parent engine[1] .....
1.3 Manufacturer's type coding as marked on the engine(s) .....
1.3.1 Location .....
1.4 Name and address of manufacturer: .....
1.5 Address(es) of assembly plant(s): .....

SECTION 2 ENGINE TYPE

2. ESSENTIAL CHARACTERISTICS OF THE ENGINE TYPE

2.1 Description of the compression ignition engine

2.1.1 Manufacturer: .....
2.1.2 Manufacturer's engine code as affixed to engines: .....
2.1.3 Cycle: four stroke/two stroke[1]
2.1.4 Bore: ..... mm
2.1.5 Stroke: ..... mm
2.1.6 Number and arrangement of cylinders: .....
2.1.7 Swept volume: ..... cm^3
2.1.8 Rated speed: ..... min^{-1}
2.1.9 Peak torque speed: ..... min^{-1}
2.1.10 Compression ratio[2]: .....
2.1.11 Combustion system: .....
2.1.12 Drawing(s) of combustion chamber and piston crown .....
2.1.13 Minimum cross sectional area of inlet and outlet ports: .....
2.1.14 Cooling system
2.1.14.1 Coolant
2.1.14.1.1 Nature of coolant: .....
2.1.14.1.2 Circulating pump(s): yes/no[1]
2.1.14.1.3 Characteristics or make(s) and type(s) (if applicable): .....
2.1.14.1.4 Drive ratio(s) (if applicable): .....

2.1.14.2 Air

2.1.14.2.1 Blower: yes/no[1] .....

2.1.14.2.2 Characteristics or make(s) and type(s) (if applicable): .....

2.1.14.2.3 Drive ratio(s) (if applicable): .....

2.1.15 Temperature permitted by the manufacturer: .....

2.1.15.1 Liquid cooling: Maximum temperature at outlet: ..... K

2.1.15.2 Air cooling: Reference point: .....

Maximum temperature at reference point: ..... K

2.1.15.3 Maximum charge-air temperature at the intercooler outlet (if applicable): ..... K

2.1.15.4 Maximum exhaust temperature at the point in the exhaust pipe(s) adjacent to the outer flange(s) of the exhaust manifold(s): ..... K

2.1.15.5 Lubricant temperature: min.: ..... K

max.: ..... K

2.1.16 Pressure charger: yes/no[1]

2.1.16.1 Make: .....

2.1.16.2 Type: .....

2.1.16.3 Description of the system (e.g. max. charge pressure, waste-gate, if applicable): .....

2.1.16.4 Intercooler: yes/no[1]

2.1.17 Intake system: maximum allowable intake depression at rated engine speed .....min [1]: .....kPa and at 100% load: ..... kPa

2.1.18 Exhaust system: Maximum permissible exhaust back pressure at rated engine speed .....min^{-1}: .....kPa and at 100% load: ..... kPa

2.2 Additional anti-pollution devices (if any, and if not covered by another heading)

Description and/or diagram(s): .....

2.3 Fuel feed

2.3.1 Feed pump

Pressure[2] or characteristic diagram:..... kPa

2.3.2 Injection system

2.3.2.1 Pump

2.3.2.1.1 Make(s): .....

2.3.2.1.2 Type(s): .....

2.3.2.1.3 Delivery: ..... and ..... mm^3 [2] per stroke or cycle at pump speed of: .....min^{-1} (rated) and .....min^{-1} (max. torque) respectively, or characteristic diagram.

State which method used: On engine/on pump bench[1] .....

2.3.2.1.4 Injection advance

2.3.2.4.4.1 Injection advance curve[2]

2.3.2.1.4.2 Timing[2] .....

2.3.2.2 Injection piping .....

2.3.2.2.1 Length ..... mm

2.3.2.2.2 Internal diameter ..... mm

2.3.2.3 Injector(s)

2.3.2.3.1 Make(s): .....

2.3.2.3.2 Type(s): .....

2.3.2.3.3 Opening pressure[2] or characteristic diagram[1]: .....

2.3.2.4 Governor(s)

2.3.2.4.1 Make (s): .....

2.3.2.4.2 Type(s): .....

2.3.2.4.3 Cut-off initiation speed under full load[2]: ..... min^{-1}

2.3.2.4.4 Maximum no-load speed[2]: ..... min^{-1}
2.3.2.4.5 Idling speed[2]: ..... min^{-1}
2.3.3 Cold start system
2.3.3.1 Make(s): .....
2.3.3.2 Type(s): .....
2.3.3.3 Description: .....

2.4 Valve timing

2.4.1 Maximum lift and opening and closing angles in relation to top dead centre or equivalent data: .....
2.4.2 Reference clearances and/or setting ranges[1]

2.5 Electronic command functions

If the engine features electronically controlled functions, information concerning their performance must be provided.

SECTION 3 COMPRESSION-IGNITION ENGINE FAMILY

3. ESSENTIAL CHARACTERISTICS OF THE ENGINE FAMILY

3.1 Common parameters defining the engine family

The engine family may be defined by basic design parameters which must be common to all engines within the family. In some cases there may be interaction of parameters. These effects must also be taken into consideration in order to ensure that only engines with similar exhaust emission characteristics are included within an engine family.

For engines to be considered to belong to the same engine family, the following list of basic parameters must be common:

3.1.1 Combustion cycle: 2 stroke/4 stroke[1]
3.1.2 Cooling medium: air/water/oil[1]
3.1.3 Swept volume: .....
- swept volumes to be within a total spread of 15%
- the number of cylinders for engines with after-treatment device must be identical

3.1.4 Method of air aspiration: naturally aspirated/pressure charged[1] .....
3.1.5 Combustion chamber type/design
- pre-chamber .....
- swirl chamber .....
- open chamber .....

3.1.6 Valve and porting - configuration, size and number
- cylinder head .....
- cylinder wall .....
- crankcase .....

3.1.7 Fuel system
- pump-line-injector .....
- in-line pump .....
- distributor pump .....
- single element .....
- unit injector .....

3.1.8 Exhaust gas recirculation .....
3.1.9 Water injection/emulsion[1] .....
3.1.10 Air injection .....
3.1.11 Charge cooling system .....
3.1.12 Oxidation catalyst .....
3.1.13 Reduction catalyst .....
3.1.14 Thermal reactor .....
3.1.15 Particulates trap .....

3.2. Choice of the parent engine

3.2.1 The parent engine of the family shall be selected using the primary criterion of the highest fuel delivery per stroke at the declared maximum torque speed. If two or more engines share this primary criterion, the parent engine shall be selected using the secondary criterion of highest fuel delivery per stroke at rated speed. Under certain circumstances, the approval authority may conclude that the worst-case emission rate of the family can best be characterized by testing a second engine. Thus, the approval authority may select an additional engine for tests based upon features which indicate that it may have the highest emission levels of the engines within that family.

3.2.2 If engines within the family incorporate other variable features which could be considered to affect exhaust emissions, these features must also be identified and taken into account in the selection of the parent engine.

3.3 List of engine types within a family

3.3.1 Name of engine family: .....
3.3.2 Specification of engine types within this family:

					Parent engine
Engine type					
Number of cylinders					
Rated speed (min^{-1})					
Fuel delivery per stroke (mm^3)					
Rated net power (kW)					
Max. torque speed (min^{-1})					
Fuel delivery per stroke (mm^3)					
Max. torque (Nm)					
Low idle speed (min^{-1})					
Piston travel (mm) as % of parent engine					100

SECTION 4 ENGINE TYPE WITHIN THE FAMILY

4. ESSENTIAL CHARACTERISTICS OF THE FAMILY'S PARENT ENGINE[3]

4.1 Description of the compression ignition engine

4.1.1 Manufacturer: .....
4.1.2 Manufacturer's engine code as affixed to engines: .....
4.1.3 Cycle: four stroke/two stroke[1]
4.1.4 Bore: ..... mm
4.1.5 Stroke: ..... mm
4.1.6 Number and layout of cylinders: .....
4.1.7 Swept volume: ..... cm^3
4.1.8 Rated speed: ..... min^{-1}
4.1.9 Peak-torque speed: ..... min^{-1}
4.1.10 Compression ratio[2]: .....
4.1.11 Combustion system description: .....
4.1.12 Drawing(s) of combustion chamber and piston crown .....
4.1.13 Minimum cross sectional area of inlet and outlet ports: .....

4.1.14 Cooling system
4.1.14.1 Coolant
4.1.14.1.1 Nature of coolant: .....
4.1.14.1.2 Circulating pump(s): yes/no[1]
4.1.14.1.3 Characteristics or make(s) and type(s) (if applicable): .....
4.1.14.1.4 Drive ratio(s) (if applicable): .....
4.1.14.2 Air
4.1.14.2.1 Blower: yes/no[1]
4.1.14.2.2 Characteristics or make(s) and type(s) (if applicable): .....
4.1.14.2.3 Drive ratio(s) (if applicable): .....
4.1.15 Temperature permitted by the manufacturer: .....
4.1.15.1 Liquid cooling: Maximum temperature at outlet: ..... K
4.1.15.2 Air cooling: Reference point: .....
Maximum temperature at reference point: ..... K
4.1.15.3 Maximum charge air temperature at the intercooler outlet (if applicable): ..... K
4.1.15.4 Maximum exhaust temperature at the point in the exhaust pipe(s) adjacent to the outer flange(s) of the exhaust manifold(s): ..... K
4.1.15.5 Lubricant temperature: min.: ..... K
max.: ..... K
4.1.16 Pressure charger: yes/no[1]
4.1.16.1 Make: .....
4.1.16.2 Type: .....
4.1.16.3 Description of the system (e.g. max. charge pressure, waste-gate, if applicable): ....
4.1.16.4 Intercooler: yes/no[1]
4.1.17 Intake system: maximum allowable intake depression at rated engine speed .....min^{-1}: .....kPa and at 100% load: ..... kPa
4.1.18 Exhaust system: Maximum permissible exhaust back pressure at rated engine speed .....min^{-1}: .....kPa and at 100% load: ..... kPa

4.2 Additional anti-pollution devices (if any, and if not covered by another heading)

- Description and/or[1] diagram(s): .....

4.3 Fuel feed

4.3.1 Feed pump
Pressure[2] or characteristic diagram ..... kPa
4.3.2 Injection system
4.3.2.1 Pump
4.3.2.1.1 Make(s): .....
4.3.2.1.2 Type(s): .....
4.3.2.1.3 Delivery: ..... mm^3 [2] per stroke or cycle at pump speed of: ..... min^{-1} (rated) and ..... min^{-1} (maximum torque), respectively, or characteristic diagram.
State which method is used: On engine/on pump bench[1] .....
4.3.2.1.4 Injection advance
4.3.2.1.4.1 Injection advance curve[2]
4.3.2.1.4.2 Timing[2] .....
4.3.2.2 Injection piping .....
4.3.2.2.1 Length ..... mm
4.3.2.2.2 Internal diameter ..... mm
4.3.2.3 Injector(s)
4.3.2.3.1 Make(s): .....
4.3.2.3.2 Type(s): .....
4.3.2.3.3 Opening pressure[2] or characteristic diagram: .....

4.3.2.4 Governor

4.3.2.4.1 Make (s): .....

4.3.2.4.2 Type(s): .....

4.3.2.4.3 Cut-off initiation speed under full load[2]: ..... min^{-1}

4.3.2.4.4 Maximum no-load speed[2]: ..... min^{-1}

4.3.2.4.5 Idling speed[2]: ..... min^{-1}

4.3.3 Cold Start System

4.3.3.1 Make(s): .....

4.3.3.2 Type(s): .....

4.3.3.3 Description: .....

4.4 Valve timing

4.4.1 Maximum lift and angles of opening and closing in relation to top dead centre or equivalent data: .....

4.4.2 Reference clearances and/or setting ranges [1]

4.5 Electronic control functions

If the engine features electronically controlled functions, the information concerning their performance must be provided.

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1 Delete where inappropriate.

2 Specify tolerance.

3 Where applications are made for several representative engines a separate form must be filled in for each of these.

4 Where appropriate.

ANNEX I
APPENDIX 2

Specimen
(Maximum format A4 (210 x 297 mm))

EC COMPONENT TYPE-APPROVAL CERTIFICATE

Stamp of administration

Communication concerning the

- component type-approval[1]
- extension of component type-approval[1]
- refusal of component type-approval[1]
- withdrawal of component type-approval, [1]

pursuant to Directive .../.../EC of a compression-ignition engine type or family that is intended to power tractors, in terms of the pollutants emitted.

EC component type-approval N°: .....

Extension No[2]: .....

Reason for extension[2]: .....

SECTION 1

0. General
0.1 Make (name of undertaking): .....
0.2 Name and address of the manufacturer (or where appropriate of his agent) of the parent-engine type and (where appropriate) of the engine types within the family[1]: .....
0.3 Manufacturer's type coding as marked on the engine(s): .....
Location: .....
Method of affixing: .....
0.4 Location, coding and method of affixing of the engine identification number: .....
0.5 Location and method of affixing of the EC component type-approval mark: .....
0.6 Address(es) of assembly plant(s): .....

SECTION II

1. Restriction on use (if any): .....
1.1 Particular conditions to be met when fitting the engine (s) to the tractor .....
1.1.1 Maximum permissible intake depression..... kPa
1.1.2 Maximum permissible back pressure..... kPa
2. The engine has been subjected to specific component type-approval YES/NO[1]
2.1 If YES
2.1.1 Reference regulations: 97/68/EC / 88/77/EEC / UN-ECE Regulation No 96[1]
2.1.2 Component type-approval No: .....
and attach the component type-approval certificate for the engine type or family concerned
2.2 If NO
2.2.1 Testing body responsible for carrying out the type-approval tests: .....
.....
2.2.2 Date of test report: .....
2.2.3 Number of test report: .....
2.2.4 Test results

Measured in accordance with the requirements of

- Directive 97/68/EC;
- Directive 88/77/EEC;
- UNECE Regulation No 96.[1]

CO (g/kWh)	HC(g/kWh)	NOx (g/kWh)	Particulates (g/kWh)

3. The undersigned hereby certifies the accuracy of the manufacturer's description of the engine type/parent engine within the family[1] given above and that the test results set out in the type-approval file are correct.

Component type-approval is granted/refused/withdrawn[1]

Place: .....
Date: .....
Signature: .....

Annex:

Component type-approval file:

---

[1] Delete where inappropriate.
[2] Where appropriate.

ANNEX I
APPENDIX 3

MARKING OF ENGINES

1. Any engine approved as a separate technical unit must bear:

1.1 the trademark or trade name of the engine's manufacturer;

1.2 the engine type, and if applicable engine family, and a unique engine identification number;

1.3 the EC component type-approval number in accordance with Annex II.

2. These marks must last throughout the useful life of the engine and remain clearly legible and indelible. If labels or plates are used, they must be affixed in such a way that they too last throughout the useful life of the engine, and the labels/plates cannot be removed without destroying or defacing them.

3. These marks must be secured to an engine part that is necessary for normal engine operation and not normally requiring replacement during engine life.

These marks must be located so as to be readily visible to the average person once the engine has been fitted to the tractor, together with all the accessories needed for engine operation. If a bonnet is to be removed in order to make the mark visible, this requirement shall be considered to have been met if removal of that bonnet is simple and does not require the use of a tool.

In case of doubt concerning the meeting of this requirement, it shall be considered to have been met if an additional mark containing at least the engine identification number and the name, trade name or logo of the manufacturer has been added. That additional mark shall be affixed to, or next to, a major component that would not normally have to be replaced during the service life of the engine, and be easily accessible, without the assistance of tools, during routine maintenance operations; otherwise, it must be located at a distance from the original mark on the engine crankcase. The original mark and, where appropriate, the additional mark shall both be clearly visible once all of the accessories needed for the operation of the engine have been fitted. A bonnet meeting the requirements set out in the above paragraph shall be authorized. The additional mark shall be affixed in a durable manner directly to the topside of the engine, for example by means of an engraving, or a sticker or plate that meets the requirements of item 2.

4. The engines must be classified by means of their identification numbers in such a way that the production sequence can be determined unambiguously.

5. Before leaving the production line, the engines must bear all of the required marks.

6. The exact location of the engine marks shall be declared in the information document, in accordance with Annexes I and II.

ANNEX I
APPENDIX 4

NUMBERING

The identification of the EC component type-approval shall consist of:

- a rectangle containing:

  a lower-case letter "e" followed by the distinguishing number or letter(s) of the Member State which has granted the component type- approval:

  "1" for Germany

  "2" for France

  "3" for Italy

  "4" for the Netherlands

  "5" for Sweden

  "6" for Belgium

  "9" for Spain

  "11" for the United Kingdom

  "12" for Austria

  "13" for Luxembourg

  "17" for Finland

  "18" for Denmark

  "21" for Portugal

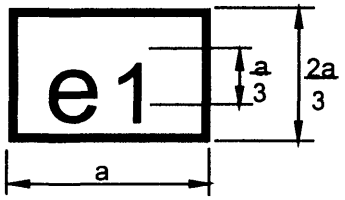
  "23" for Greece

  "IRL" for Ireland

- below this, an EC component type-approval number located close to the right-hand corner and corresponding to the number of the EC component type-approval certificate for the engine type or family in question.

Example of an EC component type-approval mark

$a \geq 30$ mm



66 - 2405 a/3

Legend: The engine bearing the above component type-approval mark was component type approved in Germany (e1) under number 66-2405.

ANNEX II

REQUIREMENTS FOR THE EC TYPE-APPROVAL OF A TRACTOR EQUIPPED WITH A COMPRESSION IGNITION ENGINE IN RESPECT OF THE POLLUTANTS EMITTED

1. DEFINITIONS

1.1 Type of tractor in terms of the pollutants emitted.
"Type of tractor in terms of the pollutants emitted" means tractors which display no essential differences with regard to the characteristics as defined in Appendix 1 to this Annex.

1.2 Pollutants emitted
"Pollutants emitted" means gaseous pollutants (carbon monoxide, hydrocarbons, and nitrogen oxides) and polluting particulates.

2. REQUEST FOR TYPE-APPROVAL

2.1 Any request for the type-approval of a tractor type in terms of the pollutants emitted shall be made by the manufacturer or his agent.

2.2 It shall be accompanied by the information document, completed in triplicate, a specimen for which is provided in Appendix 1 to this Annex.

3. TEST REQUIREMENTS

3.1. The test requirements and limit values set out in Directive 97/68/EC, as in force on the date of entry into force of this Directive, must be met.

Alternatively, until the end of the first stage laid down in Directive 97/68/EC, the following shall also be accepted:

3.1.1. the test requirements and limit values set out in Directive 88/77/EEC;

3.1.2. the test requirements and limit values set out in United Nations Economic Commission for Europe Regulation No 96.

3.2 Those tractor components which may affect the pollutants emitted shall be designed, built and assembled in such a way as to meet the technical requirements of this Directive under the tractor's normal operating conditions and despite any vibrations to which it could be subjected.

4. APPROVAL

An EC type-approval certificate conforming to the specimen provided in Appendix 2 to this Annex shall be issued.

5. ENGINE MARKING

5.1 The engine shall be marked in accordance with the requirements of Appendix 3 to Annex I. The identification number must meet the requirements of Appendix 4 to Annex I.

5.2 The marks and identification as required by Directives 97/68/EC and 88/77/EEC and United Nations ECE Regulation No 96 shall also be accepted.

6. CONFORMITY OF PRODUCTION

6.1 Without prejudice to the requirements of Article 8 of Directive 74/150/EEC, conformity of production shall be checked in accordance with the provisions of section 5 of Annex I to Directive 97/68/EC, or, where applicable, in accordance with section 8 of Annex I to Directive 88/77/EEC and on the basis of the description given in the EC type-approval certificate in Appendix 2 to this Annex.

ANNEX II
APPENDIX 1

INFORMATION DOCUMENT

CONCERNING THE EC TYPE-APPROVAL OF A TYPE OF TRACTOR EQUIPPED WITH A COMPRESSION-IGNITION ENGINE IN TERMS OF THE POLLUTANTS EMITTED

The information set out below shall, where appropriate, be supplied in triplicate and be accompanied by a list of enclosures. Any drawings needed shall be supplied to an appropriate scale and with sufficient details in A4 format or in a folder of this format. Photographs shall, where needed, show sufficient detail

SECTION 1 GENERAL

1. TRACTOR TYPE

1.1 Make (name of manufacturer): .....
1.2 Type and commercial description of the tractor .....
1.3 Manufacturer's type codes if marked on the tractor .....
1.3.1 Location .....
1.4 Name and address of manufacturer: .....
1.5 Address(es) of assembly plant(s): .....

SECTION 2 TRACTOR TYPE

2. ESSENTIAL CHARACTERISTICS OF THE TRACTOR TYPE

2.1 Description of the compression ignition engine

2.1.1 Manufacturer: .....
2.1.2 Manufacturer's code as affixed to engine: .....
2.1.3 Cycle: four stroke/two stroke[1]
2.1.4 Bore: ..... mm
2.1.5 Stroke: ..... mm
2.1.6 Number and arrangement of cylinders: .....
2.1.7 Swept volume: ..... cm^3
2.1.8 Rated speed: ..... min^{-1}
2.1.9 Peak torque speed: ..... min^{-1}
2.1.10 Compression ratio[2]: .....
2.1.11 Combustion system: .....
2.1.12 Drawing(s) of combustion chamber and piston crown .....
2.1.13 Minimum cross sectional area of inlet and outlet ports: .....
2.1.14 Cooling system
2.1.14.1 Coolant
2.1.14.1.1 Nature of coolant: .....
2.1.14.1.2 Circulating pump(s): yes/no[1]

2.1.14.1.3 Characteristics or make(s) and type(s) (if applicable): .....
2.1.14.1.4 Drive ratio(s) (if applicable): .....
2.1.14.2 Air
2.1.14.2.1 Blower: yes/no[1]
2.1.14.2.2 Characteristics or make(s) and type(s) (if applicable): .....
2.1.14.2.3 Drive ratio(s) (if applicable): .....
2.1.15 Temperature permitted by the manufacturer: .....
2.1.15.1 Liquid cooling: Maximum temperature at outlet: ..... K
2.1.15.2 Air cooling: Reference point: .....
Maximum temperature at reference point: ..... K
2.1.15.3 Maximum charge air temperature at the intercooler outlet (if applicable): ..... K
2.1.15.4 Maximum exhaust temperature at the point in the exhaust pipe(s) adjacent to the outer flange(s) of the exhaust manifold(s): ..... K
2.1.15.5 Lubricant temperature: min.: ..... K
max.: ..... K
2.1.16 Pressure charger: yes/no[1]
2.1.16.1 Make: .....
2.1.16.2 Type: .....
2.1.16.3 Description of the system (e.g. max. charge pressure, waste-gate, if applicable): ....
2.1.16.4 Intercooler: yes/no[1]
2.1.17 Intake system: maximum permissible intake depression at rated engine speed .....min^{-1}: .....kPa and at 100% load: ..... kPa
2.1.18 Exhaust system: Maximum permissible exhaust back pressure at rated engine speed .....min^{-1}: .....kPa and at 100% load: ..... kPa

2.2 Additional anti-pollution devices (if any, and if not covered by another heading)

- Description and/or diagram(s): .....

2.3 Fuel feed

2.3.1 Feed pump
Pressure[2] or characteristic diagram: ..... kPa
2.3.2 Injection system
2.3.2.1 Pump
2.3.2.1.1 Make(s): .....
2.3.2.1.2 Type(s): .....
2.3.2.1.3 Delivery: ..... and ..... mm^3 [2] per stroke or cycle at pump speed of: ..... min^{-1} (rated) and .....min^{-1} (max. torque) respectively, or characteristic diagram.
State which method used: On engine/on pump bench[1] .....
2.3.2.1.4 Injection advance
2.3.2.4.4.1 Injection advance curve[2]
2.3.2.1.4.2 Timing[2] .....
2.3.2.2 Injection piping .....
2.3.2.2.1 Length ..... mm
2.3.2.2.2 Internal diameter ..... mm
2.3.2.3 Injector(s)
2.3.2.3.1 Make(s): .....
2.3.2.3.2 Type(s): .....
2.3.2.3.3 Opening pressure[2] or characteristic diagram[1]: .....
2.3.2.4 Governor
2.3.2.4.1 Make(s): .....
2.3.2.4.2 Type(s): .....

2.3.2.4.3 Cut-off initiation speed under full load[2]: ..... min^{-1}
2.3.2.4.4 Maximum no-load speed[2]: ..... min^{-1}
2.3.2.4.5 Idling speed[2]: ..... min^{-1}
2.3.3 Cold start system
2.3.3.1 Make(s): .....
2.3.3.2 Type(s): .....
2.3.3.3 Description: .....

2.4 Valve timing

2.4.1 Maximum lift and angles of opening and closing in relation to top dead centre or equivalent data: .....
2.4.2 Reference clearances and/or setting ranges[1] .....

2.5 Electronic command functions

If the engine features electronically controlled functions, the information concerning their performance should be provided.

---

[1] Delete where inappropriate.
[2] Specify the tolerance.

ANNEX II
APPENDIX 2

Specimen

(Maximum format A4 (210 x 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 tractor equipped with a compression ignition engine pursuant to Directive .../.../EC, on pollutant emissions.

EC type-approval No: .....

Extension No[2]: .....

Reason for extension[2]: .....

SECTION 1

0. General
0.1 Make (name of manufacturer): .....
0.2 Name and address of the manufacturer (or if appropriate of his agent) of the type of tractor: .....
03 Manufacturer's type code as marked on the tractor: .....
Location: .....
Method of affixing: .....
0.4 Location, code and method of affixing of the tractor identification number: .....
.....
0.5 Location and method of affixing of the EC type-approval mark: .....
0.6 Name(s) and address(es) of assembly plant(s): .....

SECTION II

1. Restrictions on use of engine (if any): .....
1.1 Particular conditions to be met when fitting the engine(s) to the tractor
1.1.1 Maximum permissible intake depression: .....kPa
1.1.2 Maximum permissible back pressure: .....kPa

2. The engine or tractor has been subjected to specific component type-approval YES/NO[1]

2.1 If YES

2.1.1 Reference regulations: 97/68/EC / 88/77/EEC / UN-ECE Regulation No 96[1]

2.1.2 Component type-approval No: .....and attach the component type-approval certificate for the engine type or family concerned.

2.2 IF NO

2.2.1 Testing body responsible for carrying out the component type-approval tests: .....

2.2.2 Date of test report: .....

2.2.3 Number of test report: .....

2.2.4 Test results

Measured in accordance with the requirements of

- Directive 97/68/EC;
- Directive 88/77/EEC;
- UNECE Regulation No 96.[1]

CO (g/kWh)	HC(g/kWh)	NOx (g/kWh)	Particulates (g/kWh)

or attach the component type-approval certificate for the engine type or family concerned.

2.3 Tractor components which may affect the pollutants emitted (indicate, if relevant, the nature of effect): .....

3. The undersigned hereby certifies the accuracy of the manufacturer's description of the tractor type given above and that the test results mentioned in the type-approval file are correct.

Type-approval is granted/refused/withdrawn[1]

Place: .....
Date: .....
Signature: .....

Annex:

Type-approval file:

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[1] Delete where inappropriate.
[2] Where appropriate.

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