E/ECE/324
E/ECE/TRANS/505 } Rev.1/Add.95/Amend.3

6 December 2001

AGREEMENT

CONCERNING THE ADOPTION OF UNIFORM TECHNICAL PRESCRIPTIONS
FOR WHEELED VEHICLES, EQUIPMENT AND PARTS WHICH CAN BE FITTED AND/OR
BE USED ON WHEELED VEHICLES AND THE CONDITIONS FOR RECIPROCAL RECOGNITION
OF APPROVALS GRANTED ON THE BASIS OF THESE PRESCRIPTIONS */

(Revision 2, including the amendments which entered into force on 16 October 1995)

Addendum 95: Regulation No. 96

Amendment 3

01 series of amendments - Date of entry into force: 16 September 2001

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF COMPRESSION IGNITION (C.I.)
ENGINES TO BE INSTALLED IN AGRICULTURAL AND FORESTRY TRACTORS
AND IN NON-ROAD MOBILE MACHINERY WITH REGARD TO THE EMISSIONS
OF POLLUTANTS BY THE ENGINE

UNITED NATIONS

*/ Former title of the Agreement:

Agreement Concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958.

Title of the Regulation, amend to read:

"UNIFORM PROVISIONS CONCERNING THE APPROVAL OF COMPRESSION IGNITION (C.I.) ENGINES TO BE INSTALLED IN AGRICULTURAL AND FORESTRY TRACTORS AND IN NON-ROAD MOBILE MACHINERY WITH REGARD TO THE EMISSIONS OF POLLUTANTS BY THE ENGINE"

Text of the Regulation,

Paragraph 1., amend to read (including its footnote 1/):

"1. SCOPE

This Regulation applies to the emission of gaseous and particulate pollutants from C.I. engines:

1.1. used in category T vehicles 1/ having an installed net power higher than 18 kW but not more than 560 kW,

1.2. used in machinery intended and suited, to move, or to be moved on the ground, with or without road, having an installed net power higher than 18 kW but not more than 560 kW, operated under intermittent speed, including but not limited to:

1.2.1. industrial drilling rigs, compressors etc.;

1.2.2. construction equipment including wheel loaders, bulldozers, crawler tractors, crawler loaders, truck-type loaders, off-highway trucks, hydraulic excavators etc.;

1.2.3. agricultural equipment, rotary tillers;

1.2.4. forestry equipment;

1.2.5. self-propelled agricultural vehicles;

1.2.6. material handling equipment;

1.2.7. fork lift trucks;

1.2.8. road maintenance equipment (motor graders, road rollers, asphalt finishers);

1.2.9. snow plough equipment;

1.2.10. ground support equipment in airports;

1.2.11. aerial lifts;

1.2.12. mobile cranes.

1/ As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3), annex 7 (document TRANS/WP.29/78/Rev.1/Amend.2)."

Paragraph 3.2. and 3.2.1., should be deleted.

Paragraph 4.2., amend to read:

"..... indicate the series of amendments (at present 01) incorporating the most recent ....."

Insert a new paragraph 4.4.3., to read:

"4.4.3. an additional symbol consisting of a letter from D to G indicating the emission level (paragraph 5.2.1.) according to which the engine or the engine family has been approved."

Insert new paragraphs 5.1.1. to 5.1.4., to read :

"5.1.1. The technical measures taken by the manufacturer must be such as to ensure that the mentioned emissions are effectively limited, pursuant to this Regulation, throughout the normal life of the engine and under normal conditions of use. These provisions are deemed to be met if the provisions of paragraphs 5.2.1. and 7.4.2.1. are respectively complied with.

5.1.2. If a catalytic converter and/or a particulate trap is used the manufacturer must prove by durability tests, which the manufacturer may carry out in accordance with good engineering practice, and by corresponding records, that these after-treatment devices can be expected to function properly for the lifetime of the engine. The records must be produced in compliance with the requirements of paragraph 7.3. and in particular with paragraph 7.3.3. A corresponding warranty must be given to the customer.

5.1.3. Systematic replacement of the device, after a certain running time of the engine, is permissible. Any adjustment, repair, disassembly, cleaning or replacement of engine components or systems which is performed on a periodic basis to prevent malfunction of the engine in context with the after-treatment device, shall only be done to the extent that is technologically necessary to assure proper functioning of the emission control system. Accordingly scheduled maintenance requirements must be included in the customer's manual, and be covered by the warranty provisions mentioned above, and be approved before an approval is granted.

5.1.4. The corresponding extract from the manual with respect to maintenance/replacements of the after-treatment device(s), and to the warranty conditions, must be included in the information document as set out in the appendix of annex 1B to this Regulation."

Paragraph 5.2.1., the table, amend to read:

"

Power band	Net power (P) (kW)	Carbon monoxide (CO) (g/kWh)	Hydrocarbons (HC) (g/kWh)	Oxides of nitrogen (NO_x) (g/kWh)	Particulates (PT) (g/kWh)
E	$130 \leq P \leq 560$	3.5	1.0	6.0	0.2
F	$75 \leq P < 130$	5.0	1.0	6.0	0.3
G	$37 \leq P < 75$	5.0	1.3	7.0	0.4
D	$18 \leq P < 37$	5.5	1.5	8.0	0.8

"

Insert a new paragraph 5.2.2., to read:

"5.2.2. Where, as defined, according to annex 1B, one engine family covers more than one power band, the emission values of the parent engine (type approval) and of all engine types within the same family (COP) must meet the more stringent requirements of the higher power band."

Paragraph 5.2.2. (former), renumber as paragraph 5.2.3.

Paragraph 7., amend to read:

"7. CONFORMITY OF PRODUCTION

The conformity of production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2) with the following requirements:"

Paragraph 7.2. to 7.3.5., should be deleted.

Paragraphs 7.4. to 7.4.4., renumber as paragraphs 7.2. to 7.2.4.

Paragraph 8.1., amend the references to paragraphs 7.4. and 7.4.2.1. to read "7.2." and "7.2.4.1." respectively.

Insert a new paragraph 11., to read:

"11. TRANSITIONAL PROVISIONS

11.1. As from the official date of entry into force of the 01 series of amendments, no Contracting Party applying this Regulation shall refuse to grant ECE approval under this Regulation as amended by the 01 series of amendments.

11.2. As from the date of entry into force of the 01 series of amendments, Contracting Parties applying this Regulation may refuse to grant ECE approvals to engines, or engine families, of the power band E which do not meet the requirements of this Regulation as amended by the 01 series of amendments.

11.3. As from 1 January 2002, Contracting Parties applying this Regulation may refuse to grant ECE approvals to engines, or engine families, of the power band F which do not meet the requirements of this Regulation as amended by the 01 series of amendments.

11.4. As from 1 January 2003, Contracting Parties applying this Regulation may refuse to grant ECE approvals to engines, or engine families, of the power band G which do not meet the requirements of this Regulation as amended by the 01 series of amendments.

11.5. As from the date of entry into force of the 01 series of amendments, Contracting Parties applying this Regulation may refuse to grant ECE approvals to engines, or engine families, of the power band D which do not meet the requirements of this Regulation as amended by the 01 series of amendments.

11.6. As from 1 January 2002, Contracting Parties applying this Regulation may refuse the placing on the market of engines included in the power band E not approved under this Regulation as amended by the 01 series of amendments, unless they are intended to be fitted in category T vehicles. In this latter case the placing on the market of engines, or engine families, intended for fitting in category T vehicles may be allowed up to 1 July 2002.

11.7. As from 1 January 2003, Contracting Parties applying this Regulation may refuse the placing on the market of engines included in the power band F not approved under this Regulation as amended by the 01 series of amendments, unless they are intended to be fitted in category T vehicles. In this latter case the placing on the market of engines, or engine families, intended for fitting in category T vehicles may be allowed up to 1 July 2003.

11.8. As from 1 January 2004, Contracting Parties applying this Regulation may refuse the placing on the market of engines included in the power band G not approved under this Regulation as amended by the 01 series of amendments, unless they are intended to be fitted in category T vehicles. In this latter case the placing on the market of engines, or engine families, intended for fitting 1n category T vehicles may be allowed up to the same date.

11.9. As from the date of entry into force of the 01 series of amendments, Contracting Parties applying this Regulation may refuse the placing on the market of engines included in the power band D not approved under this Regulation as amended by the 01 series of amendments, unless they are intended to be fitted in category T vehicles. In this latter case the placing on the market of engines, or engine families, intended for fitting in category T vehicles may be allowed up to 1 January 2002.

11.10. By derogation to the provisions stipulated in paragraphs 11.6., 11.7., 11.8. and 11.9., Contracting Parties applying this Regulation may postpone each date mentioned in the above paragraphs for two years in respect of engines with a production date prior to the said dates.

11.11. By derogation to the provisions stipulated in paragraphs 11.6., 11.7., 11.8. and 11.9., Contracting Parties applying this Regulation may continue to permit the placing on the market of engines approved on the basis of a previous technical standard, provided that the engines are intended as replacement for fitting in vehicles in use, and that it is not technically feasible for the engines in question to satisfy the new requirements of the 01 series of amendments."

Paragraph 11. (former), renumber as paragraph 12.

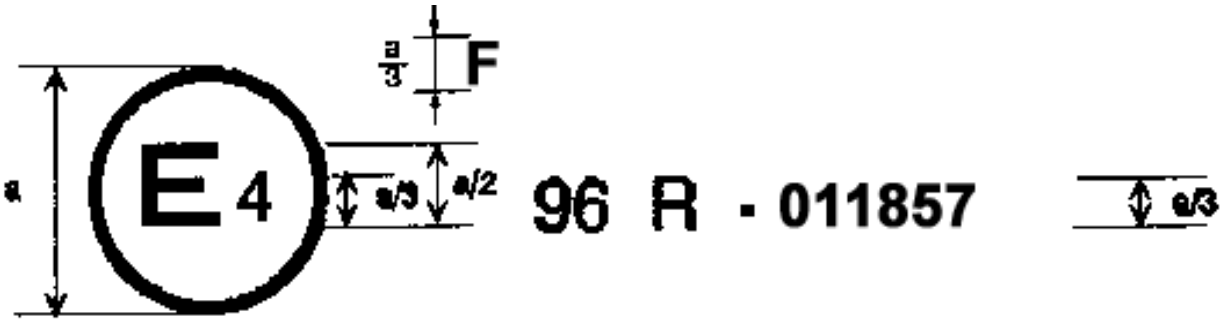
Annex 3, amend to read:

"Annex 3

ARRANGEMENTS OF APPROVAL MARKS

Model A

(See paragraph 4.4. of this Regulation)

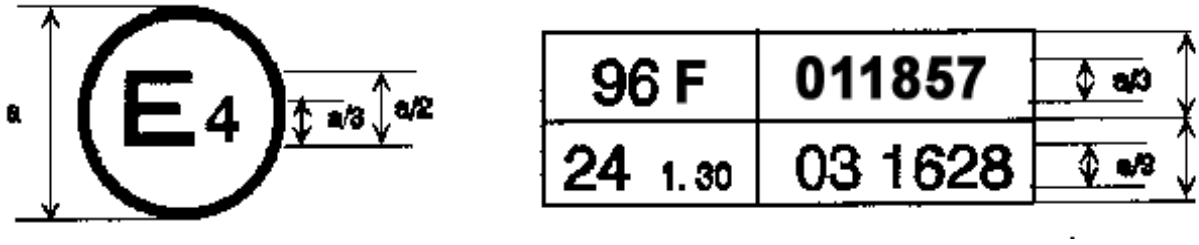


a = 8 mm min

The above approval mark affixed to an engine shows that the engine type concerned has been approved in the Netherlands (E4) pursuant to Regulation No. 96 (according to the level corresponding to power band F) and under approval number 011857. The first two digits of the approval number indicate that Regulation No. 96 was in its amended form (01 series of amendments) when the approval was granted.

Model B

(See paragraph 4.5. of this Regulation)



a = 8 mm min

The above approval mark affixed to an engine shows that the engine type concerned has been approved in the Netherlands (E4) pursuant to Regulations Nos. 96 (according to the level corresponding to power band F) and 24. The first two digits of the approval number indicate that, at the dates when the respective approvals were granted, Regulation No. 96 was already in its amended form (01 series of amendments) and Regulation No. 24 already included the 03 series of amendments."

Annex 4,

Paragraph 2.2.2., amend to read:

"2.2.2. Test validity

For a test to be recognized as valid, the parameter f_a shall be such that:

$$0.96 \leq f_a \leq 1.06$$ "

Annex 4 – Appendix 2,

Paragraph 1.2.1., amend to read:

"1.2.1. Pure gases

.....

Hydrogen-helium mixture

40 ± 2% hydrogen, balance helium)
(Contamination ≤ 1 ppm C, ≤ 400 ppm CO_2)

....."

Paragraph 1.9.2.2., amend to read:

"1.9.2.2. Water quench check

.....
..... The NO gas shall then be bubbled through water at room temperature and passed through the (H)CLD and the NO value recorded as C. The water temperature shall be determined and recorded as F. The mixture's saturation vapour pressure that corresponds to the bubbler water temperature (F) shall be determined and recorded as G. The water vapour concentration (in %) of the mixture shall be calculated as follows:

$$H = 100 * (\frac{G}{p_B})$$

and recorded as H. The expected diluted NO span gas (in water vapour) concentration shall be calculated as follows:

$$De = D * (1 - \frac{H}{100})$$

and recorded as De. For diesel exhaust, the maximum exhaust water vapour concentration (in %) expected during testing shall be estimated, under the assumption of a fuel atom H/C ratio of 1.8 to 1.0, from the maximum CO_2 concentration in the exhaust gas or from the undiluted CO_2 span gas concentration (A, as measured in paragraph 1.9.2.1.), as follows:.....
....."

Annex 4 – Appendix 3,

Paragraph 1.4.4., amend to read:

"..............
The particulate mass flow rate may be background corrected as follows:

For single filter method:

$$PT_{mass} = \left[\frac{M_f}{M_{SAM}} - \left(\frac{M_d}{M_{DIL}} * \left(\sum_{i=1}^{i=n} \left(1 - \frac{1}{DF_i} \right) * WF_i \right) \right) \right] * \frac{\overline{G_{EDFW}}}{1000}$$

If more than one measurement ....."

Annex 5 (Technical characteristics of the reference fuel),

Note 9, amend to read:

"Note 9: To be kept under constant review in the light of trends in the markets. For the purpose of the initial approval of an engine on request of the applicant, a 0.05 per cent mass nominal sulphur level (minimum 0.03 per cent mass) is permissible, in which case the measured particulate level must be corrected upward to the average value that is nominally specified for fuel sulphur content (0.15 per cent mass) per the equation below:
....."
