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Working Party on Pollution and Energy

**REPORT OF THE WORKING PARTY ON POLLUTION AND ENERGY
ON ITS FIFTY-THIRD SESSION
(Geneva, 9 – 12 January 2007)**

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I. ATTENDANCE

1. The Working Party on Pollution and Energy (GRPE) held its fifty-third session from 9 to 12 January 2007, under the chairmanship of Mr. B. Gauvin (France). Experts from the following countries participated in the work following Rule 1(a) of the Rules of Procedure of WP.29 (TRANS/WP.29/690): Belgium; Canada; Czech Republic; Denmark; France; Germany; Hungary; India; Italy; Japan; Netherlands; Norway; People's Republic of China; Poland; Republic of Korea; Republic of South Africa; Russian Federation; Serbia; Spain; Sweden; Switzerland; Turkey; United Kingdom. Experts from the European Commission (EC) also participated. Experts from the following non-governmental organizations took part in the session: European Association of Automobile Suppliers (CLEPA); European Natural Gas Vehicle Association (ENGVA); Foundation for the Automobile and Society (FIA Foundation); International Motorcycle Manufacturers Association (IMMA); International Organization for Standardization (ISO); International Organization of Motor Vehicle Manufacturers (OICA); Association for Emission Control by Catalyst (AECC/CEFIC); Engine Manufacturers Association (EMA); European Association of Internal Combustion Engine Manufacturers (EUROMOT); European Committee of Associations of Manufacturers of Agricultural Machinery (CEMA); European LPG Association (AEGPL); International Association of Natural Gas Vehicles (IANGV); the Oil Companies European Organization for Environment, Health and Safety (CONCAWE).

II. INFORMAL MEETINGS

2. Following the agreement reached at the fifty-second GRPE session, three informal meetings were held prior to the proper session of the fifty-third GRPE (see ECE/TRANS/WP.29/GRPE/2007/1, Corr.1 and paras. 2 to 5 below). The informal meetings on Hydrogen and Fuel Cell Vehicles – Subgroup Environment (HFCV-SGE) and on Off-Cycle Emissions (OCE), initially scheduled to be held on 8 and 10 January 2007, were cancelled.

3. The ninth informal meeting of the GRPE working group on Worldwide harmonized Motorcycle emission Test Cycle (WMTC), was held on 9 January 2007 (morning only), under the Chairmanship of Mr. C. Albus (Germany). A summary of the proceedings of this informal meeting is given below (paras. 12 and 13).

4. The sixteenth informal meeting of the GRPE working group on the emissions from Non-Road Mobile Machinery (NRMM) was held on 9 January 2007 (afternoon only) under the Chairmanship of Mr. G. De Santi (European Commission). A summary of the proceedings of this informal meeting is given below (paras. 14-16).

5. The eighteenth informal meeting of the GRPE working group on Particulate Measurement Programme (PMP) was held on 10 January 2007 (morning only) under the Chairmanship of Mr. C. Parkin (United Kingdom). A summary of the proceedings of this informal meeting is given below (paras. 9-11).

III. FIFTY-THIRD SESSION OF GRPE PROPER

A. REGULATION No. 49 (Emissions of C.I. and P.I. (NG and LPG) engines) (Agenda item 1)

1. Off-Cycle Emissions (OCE) (Agenda item 1.1)

6. GRPE noted with regret that the informal meeting on Off-Cycle Emissions (OCE), initially scheduled to be held on 10 January 2007, had been cancelled. It was agreed that the OCE working group should resume its considerations prior to the next GRPE session in June 2007 (para. 43 below).

2. Amendments to UNECE Regulation No. 49 (Agenda item 1.2)

Documentation: ECE/TRANS/WP.29/GRPE/2007/5; Informal document No. GRPE-53-02 of Annex 1 to this report

7. The expert from the EC introduced ECE/TRANS/WP.29/GRPE/2007/5 and GRPE-53-02 proposing the alignment of the provisions of Regulation No. 49 with those of the corresponding European Union (EU) directive. GRPE welcomed the proposals and agreed on the urgency of that alignment. The document received some comments by the expert from the Russian Federation and by the secretariat.

8. GRPE adopted ECE/TRANS/WP.29/GRPE/2007/5, as amended by Annex 2, and agreed to have, at its next session in June 2007, a final review of the document. The secretariat was requested to submit the proposal to WP.29 and AC.1, for consideration at their June 2007 sessions, as draft 05 series of amendments (Revision 4) to Regulation No. 49.

B. PARTICULATE MEASUREMENT PROGRAMME (PMP) (Agenda item 2)

9. The Chairman of the PMP working group, Mr. C. Parkin (United Kingdom), reported about the progress made by the working group since the previous GRPE session. He informed GRPE that the light-duty inter-laboratory exercise had been completed successfully. The revised particle mass and particle number measurement methods had shown excellent repeatability and a good reproducibility. Both methods had also shown a good correlation with alternative particle measurement systems. He added that the draft report (available as working paper No. GRPE-PMP-18-2 at the GRPE/PMP website) had been discussed during the eighteenth meeting of the informal group (see para. 5 above). He announced his intention to insert the final calibration and characterization results into that report, which would be prepared as an official document for consideration at the next GRPE session in June 2007.

10. Mr. Parkin also informed GRPE about the results of the kick-off meeting of the PMP working group on the heavy-duty inter-laboratory correlation exercise. He reported that the group had agreed to run a European validation programme. He welcomed the cooperation by OICA and CONCAWE to provide, for the Round Robin exercise, the "golden" engine respectively the fuel and lubricants. GRPE noted that the initial testing would start at the Joint Research Centre (JRC) in Ispra (Italy) on March 2007 and that the test programme would have an expected duration of 2 years.

11. GRPE agreed that the PMP working group should also meet prior to its next session in June 2007 (para. 43 below).

C. WORLDWIDE HARMONIZED MOTORCYCLE EMISSION TEST CYCLE (WMTC) (Agenda item 3)

Documentation: Informal documents Nos. GRPE-53-11 and GRPE-53-12 of Annex 1 to this report

12. Mr. C. Albus (Germany), chairing the WMTC working group, gave a summary of the current status of the group's work regarding the second stage of gtr No. 2 (GRPE-53-12), focusing on the concerns raised by India and China on the WMTC test cycle as well as on the improvement of the vehicle classification concept and the insertion of performance requirements. He reported on the main outcomes of the group's meetings held on October and November 2006, and presented the proposal for amendments to gtr No. 2 (GRPE-53-11). He invited all GRPE experts to send him, in due time, their comments to prepare the final document.

13. GRPE agreed to resume its consideration of this subject at the next session in June 2007, on the basis of the new proposal by WMTC, to be distributed as an official document.

D. EXHAUST EMISSION TEST PROTOCOL FOR NON-ROAD MOBILE MACHINERY ENGINES (NRMM) (Agenda item 4)

Documentation: Informal document No. GRPE-53-05 of Annex 1 to this report

14. The Chairman of the NRMM informal group, Mr. G. De Santi (EC), reported on the progress of work made by the group during the recent meetings in September and December 2006, as well as prior to the GRPE session (see para. 4). He introduced the preliminary and progress report (GRPE-53-05) on the development of the gtr on NRMM. He announced the group's intention to finalize the draft gtr by the end of this year. He indicated the group's initiation to backup the gtr with a guidance document, which would include additional explanations and background information for the users of the gtr. He added that the NRMM group would meet again in Ispra (Italy), on April 2007

15. GRPE acknowledged the progress made by the group and fully endorsed the group's proposal for a guidance document for the use of the gtr. GRPE agreed to limit the scope to compression ignition engine only. The informal group was invited to think about a possible marking of the engines.

16. The expert from the EC volunteered to submit a revised progress report to WP.29 and AC.3, for consideration at their June 2007 sessions. The GRPE Chairman suggested that the group should also meet prior to the next GRPE session in June 2007 (para. 43 below).

E. AMENDMENTS TO UNECE REGULATIONS (Agenda item 5)

1. Regulation No. 67 (Equipment for liquefied petroleum gas vehicles)
(Agenda item 5.1)

Documentation: ECE/TRANS/WP.29/GRPE/2007/2; Informal document No. GRPE-53-09 of Annex 1 to this report

17. Recalling the purpose of ECE/TRANS/WP.29/GRPE/2007/2 (tabled by India), the expert from Italy introduced GRPE-53-09 proposing the insertion of new specifications for the endurance test of the pressure regulator and vaporizer.

18. GRPE adopted ECE/TRANS/WP.29/GRPE/2007/2, as amended by Annex 3, and requested the secretariat to submit it to WP.29 and AC.1, for consideration at their June 2007 sessions, as draft Supplement 8 to the 01 series of amendments to Regulation No. 67.

2. Regulation No. 83 (Emissions of M1 and N1 categories of vehicles)
(Agenda item 5.2)

Documentation: TRANS/WP.29/GRPE/2005/3; Informal document No. GRPE-53-03 of Annex 1 to this report

19. The expert from the United Kingdom introduced GRPE-53-03 proposing to amend in Regulation No. 83 the current particle mass measurement procedure and to incorporate the particle number measurement procedure in line with the conclusions of the PMP particle measurement programme (see para. 9 above). He added that the limit values for both measurement procedures would be included at a later stage.

20. The expert from Switzerland supported the proposal in principle and urged for a quick adoption. A large number of delegates raised their study reservations. The EC expert preferred to include additional provisions for the in-service conformity of vehicles. In the absence of data on the particle number measurement method, the expert from Italy raised his doubts on the possible insertion of future limit values for the number of particles.

21. Following the discussion, the expert from the United Kingdom announced his intention to organize a PMP informal meeting on this issue. All experts were invited to send him in due time their written comments on GRPE-53-03. Note: The secretariat received an email confirming that this meeting will take place in London on 20 February 2007.

22. Recalling the purpose of TRANS/WP.29/GRPE/2005/3, the expert from France informed GRPE about the ongoing work in the European Union on a new proposal to insert into the Regulation new provisions for special gear shifting strategies. He added that some study

results were not yet available and that an expert meeting on this subject would be convened in Brussels.

23. GRPE agreed to resume consideration of this subject at its next session on the basis of a new proposal, jointly prepared by France and the European Commission.

3. Regulation No. 96 (Diesel emissions of agricultural tractors) (Agenda item 5.3)

Documentation: ECE/TRANS/WP.29/GRPE/2006/7/Rev.1; Informal document No. GRPE-53-04 of Annex 1 to this report

24. The expert from EUROMOT recalled the purpose of document ECE/TRANS/WP.29/GRPE/2006/7/Rev.1 proposing the insertion of new provisions for constant speed engines. He supplemented that proposal with additional requirements concerning the determination of deterioration factors for certain emission levels (GRPE-53-04).

25. GRPE adopted ECE/TRANS/WP.29/GRPE/2006/7/Rev.1, as amended by Annex 4, and requested the secretariat to submit it to WP.29 and AC.1, for consideration at their June 2007 sessions, as draft 02 series of amendments to Regulation No. 96.

4. Regulation No. 110 (Specific components for CNG) (Agenda item 5.4)

Documentation: ECE/TRANS/WP.29/GRPE/2007/3; ECE/TRANS/WP.29/GRPE/2007/6; Informal document No. GRPE-53-10 of Annex 1 to this report

26. With regard to the design of seamless and welded metal liners, the expert from Germany introduced ECE/TRANS/WP.29/GRPE/2007/3 proposing to extend the current requirements in the Regulation to the use of stainless steels. GRPE adopted the document, with the amendment reproduced below, and requested the secretariat to submit it to WP.29 and AC.1, as draft Supplement 7 to Regulation No. 110, for consideration at their June 2007 sessions.

Page 2, paragraph 2., correct the reference "EN ISO 5817 XXX" to read " EN ISO 5817 2003".

27. The expert from ENGVA presented ECE/TRANS/WP.29/GRPE/2007/6 regarding the harmonization of fuel connectors. GRPE also adopted the document, without an amendment, and requested the secretariat to submit it to WP.29 and AC.1, as a part (para. 26 above) of draft Supplement 7 to Regulation No. 110, for consideration at their June 2007 sessions.

28. For the same purpose as that mentioned under agenda item 5.1., the expert from Italy proposed the insertion into Regulation No. 110 of new specifications for the endurance test of the pressure regulator and vaporizer (GRPE-53-10). GRPE adopted the proposal, as reproduced in Annex 5 to this report, and requested the secretariat to submit it to WP.29 and AC.1, as a part (paras. 26 and 27 above) of draft Supplement 7 to Regulation No. 110, for consideration at their June 2007 sessions.

5. Regulation No. 120 (Net power of engines for tractors and non-road mobile machinery) (Agenda item 5.5)

Documentation: ECE/TRANS/WP.29/GRPE/2007/4 and Corr.1

29. GRPE noted the proposal by Belarus for correcting the current wording of the Russian version of Regulation No. 120. GRPE adopted ECE/TRANS/WP.29/GRPE/2007/4 and requested the secretariat to submit it to WP.29 and AC.1, as draft Corrigendum 1 (Russian only) to Regulation No. 120, for consideration at their June 2007 sessions.

6. Collective amendments to Regulations regarding the extension of their scopes to three-wheelers (Agenda item 5.6)

30. The expert from India volunteered to prepare a concrete proposal on this issue for consideration at the next GRPE session.

F. HYDROGEN AND FUEL CELL VEHICLES – SUBGROUP ENVIRONMENT (HFCV-SGE) (Agenda item 6)

31. Mr. Albus, HFCV Project Manager, informed GRPE about the exchange of information between the co-sponsors (Germany, Japan and United States of America) and their intention to present at the forthcoming WP.29 and AC.3 sessions in March 2007, a roadmap on the development of a gtr on hydrogen and fuel cell vehicles (ECE/TRANS/WP.29/1056, para. 110).

32. GRPE agreed to resume consideration of this subject at its next session. The Subgroup Environment (SGE) should also meet prior to the GRPE session in June 2007 (see para. 43 below).

G. ENVIRONMENTALLY FRIENDLY VEHICLES (EFVs) (Agenda item 7)

Documentation: Informal document No. GRPE-53-06 of Annex 1 to this report

33. The expert from Germany announced that the next EFV Conference will be held in Dresden on 19 and 20 November 2007 (GRPE-53-06). He gave a presentation on the aim and tasks of that international conference. He volunteered to keep WP.29 and GRPE informed about all further details.

34. GRPE welcomed the initiation by Germany and the intention to go further by considering the overall influence of fuels, vehicle technologies and the emissions of pollutants. GRPE agreed to contribute actively to that event. The GRPE Chairman suggested resuming consideration of possible contributions at the next session.

H. EXCHANGE OF INFORMATION ON NATIONAL AND INTERNATIONAL REQUIREMENTS ON EMISSIONS (Agenda item 8)

35. The expert from ISO reported on the successful outcome of the ISO round table on global harmonization of regulations, codes and standards for gaseous fuels and vehicles, which was held in Geneva on 10 January 2007. He added that all presentations made during the round table were available at: <http://www.iso.org/iso/en/commcentre/events/2006/roundtable.html>. He announced his intention to present the final report of the round table at the forthcoming WP.29 session in March 2007.

I. 1997 AGREEMENT (INSPECTIONS) (Agenda item 9)

1. Rule No. 1 (Agenda item 9.1.)

36. With regard to the amendments to Rule No. 1, GRPE noted that WP.29 and AC.4 had adopted, at their June 2006 sessions, the GRPE proposal including a correction to paragraph 3. (see report ECE/TRANS/WP.29/1052, para. 66). The adopted amendment, deemed to enter into force on 3 July 2007, would make possible the accession of the European Community to the Agreement.

J. OTHER BUSINESS (Agenda item 10)

1. ECMT report on the abatement of NO_x emissions (Agenda item 10.1)

Documentation: Informal document No. GRPE-53-01 of Annex 1 to this report

37. GRPE noted the conclusions and recommendations by the European Conference of Ministers of Transport (ECMT) on the abatement of NO_x emissions (GRPE-53-01). The full report will be made available upon request. GRPE acknowledged that the new gtr No. 4 on the world-wide harmonized heavy-duty certification procedure (WHDC) was addressing the ECMT concern for heavy-duty vehicles. GRPE recognized its preparedness to proceed towards a similar remedy for light duty commercial vehicles, awaiting the instructions by WP.29 and AC.3 to start consideration of the world-wide light-duty test procedures (WLTP).

2. Regulation No. 100 (Battery electric vehicles) (Agenda item 10.2)

Documentation: Informal document No. GRPE-53-07 of Annex 1 to this report

38. The expert from Germany introduced GRPE-53-07 proposing to insert into Regulation No. 100 new provisions regarding the protection against electric shocks. The expert from Japan gave a presentation on electric safety of electrical vehicles (EV) and hybrid electrical vehicles (HEV).

39. GRPE acknowledged that this issue was not related to pollution and energy, and agreed on the need to seek the advice of WP.29 on this issue, and more generally on how to deal with specific safety regulations related to the use of alternative fuels (LPG, CNG, electric power, etc.).

3. Gtr No. 4 (WHDC) (Agenda item 10.3)

Documentation: Informal document No. GRPE-53-08 of Annex 1 to this report

40. GRPE agreed on the need to re-establish the informal group on WHDC in order to find a solution for the elimination of the remaining options (hot soak period, cold start weighing factors, particulate filter material and filter size).

41. The expert from India introduced GRPE-53-08 proposing to amend in gtr No. 4 the definition of "high speed n_{hi} " to avoid difficulties in applying the test cycle for gas engine. GRPE referred this issue to the WHDC informal group. The GRPE Chairman suggested that the WHDC group should meet again in Geneva prior to the GRPE session in June 2007 (see para. 43 below).

4. Tributes to Mr. M. Mormile (Agenda item 10.4)

42. Learning that Mr. Mario Mormile (OICA) had decided to take his retirement and that he would no longer attend the sessions, GRPE acknowledged his fruitful and professional contributions over the last 10 years and honoured him with a long applause.

IV. PROVISIONAL AGENDA FOR THE NEXT SESSION

43. For its fifty-fourth session to be held in Geneva, Palais des Nations, GRPE decided to start on Monday afternoon, 4 June 2007, 2.30 p.m. until Friday, 8 June 2007, 12.30 a.m. For that purpose, the following agenda was agreed:

(a) Informal meeting of the GRPE working group on Hydrogen and Fuel Cell Vehicles – Subgroup Environment (HFCV-SGE)

To be held on Monday afternoon, 4 June 2007, from 2.30 p.m. till 5.30 p.m. The agenda of the meeting will be prepared by the HFCV-SGE secretariat and distributed to the members of the group prior to the meeting. This meeting will be held without interpretation.

(b) Informal meeting of the GRPE working group on the emissions of Non-Road Mobile Machinery (NRMM)

To be held on Tuesday morning, 5 June 2007, from 9.30 a.m. till 12.30 a.m. The agenda of the meeting will be prepared by the NRMM secretariat and distributed to the members of the group prior to the meeting. This meeting will be held without interpretation.

(c) Informal meeting of the GRPE working group on Off-Cycle Emissions (OCE)

To be held on Tuesday afternoon, 5 June 2007, from 2.30 p.m. till 5.30 p.m. The agenda of the meeting will be prepared by the OCE secretariat and distributed to the members of the group prior to the meeting.

(d) Informal meeting of the GRPE working group on the World-wide harmonized heavy-duty certification procedure (WHDC)

To be held on Wednesday morning, 6 June 2007, from 9.30 a.m. till 12.30 a.m. The agenda of the meeting will be prepared by the WHDC group secretariat and distributed to the members of the group prior to the meeting.

(e) Informal meeting of the GRPE working group on the Particulate Measurement Programme (PMP)

To be held on Wednesday afternoon, 6 June 2007, from 2.30 p.m. till 5.30 p.m.. The agenda of the meeting will be prepared by the PMP secretariat and distributed to the members of the group prior to the meeting.

(f) Fifty-fourth session of the GRPE proper

To be held on Thursday, 7 June 2007, from 9.30 a.m. to Friday, 8 June 2007, until 12.30 a.m.: 1/

1. Regulation No. 49 (Emissions of C.I., NG, and P.I. (LPG) engines):
 - (a) Off-Cycle Emissions (OCE);
 - (b) World-wide harmonized heavy-duty certification procedure (WHDC);
 - (c) Amendments to UNECE Regulation No. 49.
2. Particle Measurement Programme (PMP).
3. Development of a worldwide motorcycle emission test cycle (WMTC).
4. Exhaust emissions test protocol of Non-Road Mobile Machinery (NRMM).
5. Amendments to UNECE Regulations:
 - (a) Regulation No. 83 (Emissions of M1 and N1 categories of vehicles);
 - (b) Collective amendments to Regulations regarding the extension of their scopes to three-wheelers.
6. Hydrogen and Fuel Cell Vehicles – Subgroup Environment (HFCV-SGE).
7. Environmentally Friendly Vehicles (EFV).
8. Exchange of information on national and international requirements on emissions 2/.
9. 1997 Agreement (Periodical technical inspections).
10. Other business.

1/ As part of the secretariat's efforts to reduce expenditure, all the official documents distributed by mail prior to the session as well as the informal documents placed on the UNECE WP.29 website, will not be available in the conference room for distribution to session participants. Delegates are kindly requested to bring their copies of documents to the meeting. (The WP.29 website address is: <http://www.unece.org/trans/main/welcwp29.htm> select GRPE and find "working documents" as well as "informal documents").

For the translation of the above-mentioned official documents, delegates can now access the new public Official Document System (ODS) at the website address: <http://documents.un.org>.

2/ Delegations are invited to submit brief written statements on the latest status in national requirements and, if necessary, to supplement this information orally.

Annex ILIST OF INFORMAL DOCUMENTS (GRPE-53-...)
DISTRIBUTED WITHOUT AN OFFICIAL SYMBOL DURING THE SESSION

No.	Transmitted by	Agenda item	Language	Title	Follow -up
01.	Secretariat	10.1.	E	NO _x Emissions: ensuring future exhaust emissions regulations deliver air quality standards: conclusions and recommendations	(a)
02.	EC	1.2.	E	Communication from the European Commission to GRPE	(a)
03.	United Kingdom	5.2.	E	Proposal for draft Supplement 7 to the 05 series of amendments to Regulation No. 83	(c)
04.	EUROMOT	5.3.	E	Proposal for the 02 series of amendments to Regulation No. 96	(a)
05.	EC/NRMM	4.	E	Preliminary and progress report on the development of a global technical regulation on non-road mobile machinery engines	(a)
06.	Germany	7.	E	Content of the 3rd EFV Conference, 19 and 20 November 2007, in Dresden, Germany	(a)
07.	Germany	10.2.	E	Proposal for amendments to Regulation No. 100	(b)
08.	India	10.3.	E	Proposal for draft amendments to global technical regulation (gtr No. 4) on world-wide harmonized heavy-duty certification (WHDC)	(a)
09.	Italy	5.1.	E	Proposal for amendments to Regulation No. 67	(a)
10.	Italy	5.4.	E	Proposal for amendments to Regulation No. 110	(a)
11.	Germany	3.	E	Gtr No. 2 (WMTC): Measurement procedure for two-wheeled motorcycles equipped with a positive or compression ignition engine	(c)
12.	Germany	7.	E	Draft report to 53rd GRPE: Status report on stage 2 of WMTC (gtr No. 2)	(a)

Notes:

- (a) Consideration completed or to be superseded
- (b) Continue consideration at the next session as an informal document
- (c) Continue consideration at the next session as an official working document

Annex II

ADOPTED AMENDMENTS TO DOCUMENT ECE/TRANS/WP.29/GRPE/2007/5
(Regulation No. 49) (see paragraph 8 of this report)

Page 61, insert a new Annex 1, to read:

"Annex 1

INFORMATION DOCUMENT

This information document is related to the approval according to Regulation No. 49. It is referring to measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles.

Vehicle type/parent engine/engine type (1).....

0. GENERAL

- 0.1. Make (name of undertaking):
- 0.2. Type and commercial description (mention any variants):
- 0.3. Means and location of identification of type, if marked on the vehicle:
- 0.4. Category of vehicle (if applicable):
- 0.5. Category of engine: diesel/NG fuelled/LPG fuelled/ethanol fuelled (1).....
- 0.6. Name and address of manufacturer:
- 0.7. Location of statutory plates and inscriptions and method of affixing:
- 0.8. In the case of components and separate technical units, location and method of affixing of the ECE approval mark:
- 0.9. Address(es) of assembly plant(s):.....

Attachments:

- 1. Essential characteristics of the (parent) engine and information concerning the conduct of test (see Appendix 1).
- 2. Essential characteristics of the engine family (see Appendix 2).
- 3. Essential characteristics of the engine types within the family (see Appendix 3).
- 4. Characteristics of the engine-related vehicle parts, if applicable (see Appendix 4).
- 5. Photographs and/or drawings of the parent engine type and, if applicable, of the engine compartment.
- 6. List further attachments, if any.

Date and place

1/ Delete as appropriate."

Page 62, Annex 1 (former), correct "Annex 1" to read "Annex 1 – Appendix 1"

Page 71, Appendix 1 (former), correct "Appendix 1" to read "Annex 1 – Appendix 2"

Page 73, Appendix 2 (former), correct "Appendix 2" to read "Annex 1 – Appendix 3"

Page 78, Appendix 2 (former), items 6.3.1. to 6.3.1.5., replace "Error! Bookmark not defined" by the reference to footnote "4".

Page 79, Appendix 3 (former), correct "Appendix 3" to read "Annex 1 – Appendix 4"

Page 80, Appendix 4 (former), correct "Appendix 4" to read "Annex 1 – Appendix 5"

Page 86, Annex 2B, item 2., correct to read "Vehicle make and type"

Page 86, Annex 2B, insert a new item 14., to read:

"14. Approval number of the engine/engine family, if approved as a separate technical unit"

Pages 86 and 87, Annex 2B, items 14. to 17. (former), renumber as items 15. to 18.

Add a new Annex 10, as reproduced in ECE/TRANS/WP.29/2006/124 and Amend.1 (adopted by WP.29 and AC.1 at their November 2006 sessions, see report ECE/TRANS/WP.29/1056, para. 85).

Add a new Annex 11, as reproduced in ECE/TRANS/WP.29/2006/125 (adopted by WP.29 and AC.1 at their November 2006 sessions, see report ECE/TRANS/WP.29/1056, para. 85).

Annex III

ADOPTED AMENDMENTS TO DOCUMENT ECE/TRANS/WP.29/GRPE/2007/2
(Regulation No. 67) (see paragraph 18 of this report)

Annex 15

Insert a new paragraph 9.6., to read:

"9.6. Endurance test for pressure regulator and vaporizer

The regulator shall be able to withstand 50,000 cycles without any failure when tested according to the following procedure:

- (a) Recycle the regulator for 95 per cent of the total number of cycles at room temperature and at the classification pressure. Each cycle shall consist of flow until stable outlet pressure has been obtained, after which the gas flow shall be shut off by a downstream valve within 1 s, until the downstream lock-up pressure has stabilized. Stabilized outlet pressures are defined as set pressure \pm 15 per cent for at least 5 s.
- (b) Cycle the inlet pressure of the regulator for 1 per cent of the total number of cycles at room temperature from 100 per cent to 50 per cent of the classification pressure. The duration of each cycle shall be no less than 10 s.
- (c) Repeat the cycling procedure listed in sub-paragraph (a) at 120 °C at the classification pressure for 1 per cent of the total number of cycles.
- (d) Repeat the cycling procedure listed in sub-paragraph (b) at 120 °C at the classification pressure for 1 per cent of the total number of cycles.
- (e) Repeat the cycling procedure listed in sub-paragraph (a) at -20 °C and 50 per cent of classification pressure for 1 per cent of the total number of cycles.
- (f) Repeat the cycling procedure listed in sub-paragraph (b) at -20 °C and 50 per cent of classification pressure for 1 per cent of the total number of cycles.
- (g) At the completion of all tests indicated in sub-paragraphs (a), (b), (c), (d), (e) and (f), the regulator shall be leak proof as described under external leakage test under paragraph 5., at the temperatures of -20 °C, at the room temperature and at the temperature of $+120$ °C."

Annex IV

ADOPTED AMENDMENTS TO DOCUMENT ECE/TRANS/WP.29/GRPE/2006/7/Rev.1
(Regulation No. 96) (see paragraph 25 of this report)

Contents, amend to read:

"Annex 4 - Appendix 5 – Durability Requirements"

Insert a new paragraph 2.13., to read:

"2.13. "emission durability period" means the number of hours indicated in Annex 4, Appendix 4, used to determine the deterioration factors."

Paragraph 2.13. (former), renumber as paragraph 2.14.

Paragraph 5.2.1., after the table, insert a sentence to read:

"The limit values for power bands H to K shall include deterioration factors calculated in accordance with Annex 4, Appendix 5."

Paragraphs 11.1. to 11.9., amend to read

- 11.1. As from the official date of entry into force of the 02 series of amendments, no Contracting Party applying this Regulation shall refuse to grant ECE approval under this Regulation as amended by the 02 series of amendments.
- 11.2. As from the date of entry into force of the 02 series of amendments, Contracting Parties applying this Regulation may refuse to grant ECE approvals to intermittent speed engines, or engine families, of the power bands H, I, J and K which do not meet the requirements of this Regulation as amended by the 02 series of amendments.
- 11.3. As from the date of entry into force of the 02 series of amendments, Contracting Parties applying this Regulation may refuse the placing on the market of intermittent speed engines, or engine families, included in the power bands H, I, J and K not approved under this Regulation as amended by the series 02 of amendments.
- 11.4. As from 1 January 2010, Contracting Parties applying this Regulation may refuse to grant ECE approvals to constant speed engines, or engine families, of the power bands H, I and K which do not meet the requirements of this Regulation as amended by the 02 series of amendments.
- 11.5. As from 1 January 2011, Contracting Parties applying this Regulation may refuse to grant ECE approvals to constant speed engines, or engine families, of the power band J which do not meet the requirements of this Regulation as amended by the 02 series of amendments.

- 11.6. As from 1 January 2011, Contracting Parties applying this Regulation may refuse the placing on the market of constant speed engines, or engine families, included in the power bands H, I and K not approved under this Regulation as amended by the series 02 of amendments.
- 11.7. As from 1 January 2012, Contracting Parties applying this Regulation may refuse the placing on the market of constant speed engines, or engine families, included in the power band J not approved under this Regulation as amended by the series 02 of amendments."

Paragraphs 11.8. and 11.9. (former), should be deleted.

Paragraphs 11.10. and 11.11. (former), renumber as paragraphs 11.8. and 11.9., and amend to read:

- "11.8. By derogation to the provisions stipulated on paragraphs 11.3., 11.6. and 11.7., 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.
- 11.9. By derogation to the provisions stipulated in paragraphs 11.3., 11.6. and 11.7., 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 02 series of amendments."

Annex 4

Add a new Appendix 5, to read:

"Annex 4 - Appendix 5

EMISSION DURABILITY REQUIREMENTS

This appendix shall apply to power bands H to K only.

1. Emission durability period and deterioration factors
 - 1.1. Manufacturers shall determine a Deterioration Factor (DF) value for each regulated pollutant for all power band H to K engine families. Such DFs shall be used for type approval and production line testing by either:
 - (a) adding the DF to the emission test result, if paragraph 1.2.1. applies, or
 - (b) multiplying the emission test result with the DF, if paragraph 1.2.2. applies.

1.1.1. Test to establish DFs shall be conducted as follows:

1.1.1.1. The manufacturer shall conduct durability tests to accumulate engine operating hours according to a test schedule that is selected on the basis of good engineering judgement to be representative of in-use engine operation in respect to characterizing emission performance deterioration. The durability test period should typically represent the equivalent of at least one quarter of the emission durability period (EDP).

Service accumulation operating hours may be acquired through running engines on a dynamometer test bed or from actual in-field machine operation. Accelerated durability tests can be applied whereby the service accumulation test schedule is performed at a higher load factor than typically experienced in the field. The acceleration factor relating the number of engine durability test hours to the equivalent number of EDP hours shall be determined by the engine manufacturer based on good engineering judgement.

During the period of the durability test, no emission sensitive components can be serviced or replaced other than to the routine service schedule recommended by the manufacturer.

The test engine, subsystems, or components to be used to determine exhaust emission DFs for an engine family, or for engine families of equivalent emission control system technology, shall be selected by the engine manufacturer on the basis of good engineering judgement. The criterion is that the test engine should represent the emission deterioration characteristic of the engine families that will apply the resulting DF values for certification approval. Engines of different bore and stroke, different configuration, different air management systems, different fuel systems can be considered as equivalent in respect to emissions deterioration characteristics if there is a reasonable technical basis for such determination.

DF values from another manufacturer can be applied if there is a reasonable basis for considering technology equivalence with respect to emissions deterioration, and evidence that the tests have been carried according to the specified requirements.

Emissions testing will be performed according to the procedures defined in this Regulation for the test engine after initial run-in but before any service accumulation, and at the completion of the durability. Emission tests can also be performed at intervals during the service accumulation test period, and applied in determining the deterioration trend.

1.1.1.2. The service accumulation tests or the emissions tests performed to determine deterioration shall not be witnessed by the approval authority.

1.1.1.3. Determination of DF values from durability tests

An additive DF is defined as the value obtained by subtraction of the emission value, determined at the beginning of the EDP, from the emissions value determined to represent the emission performance at the end of the EDP.

A multiplicative DF is defined as the emission level determined for the end of the EDP divided by the emission value recorded at the beginning of the EDP.

Separate DF values shall be established for each of the pollutants covered by the legislation. In the case of establishing a DF value relative to the NO_x + HC standard, for an additive DF, this is determined based on the sum of the pollutants notwithstanding that a negative deterioration for one pollutant may not offset deterioration for the other. For a multiplicative NO_x+HC DF, separate HC and NO_x DFs shall be determined and applied separately when calculating the deteriorated emission levels from an emissions test result before combining the resultant deteriorated NO_x and HC values to establish compliance with the standard.

In cases where the testing is not conducted for the full EDP, the emission values at the end of the EDP are determined by extrapolation of the emission deterioration trend established for the test period, to the full EDP.

When emissions test results have been recorded periodically during the service accumulation durability testing, standard statistical processing techniques based on good practice shall be applied to determine the emission levels at the end of the EDP; statistical significance testing can be applied in the determination of the final emissions values.

If the calculation results in a value of less than 1.00 for a multiplicative DF, or less than 0.00 for an additive DF, then the DF shall be 1.0 or 0.00, respectively.

- 1.1.1.4. A manufacturer may, with the approval of the type approval authority, use DF values established from results of durability tests conducted to obtain DF values for certification of on-road HD CI engines according to ECE Regulation No. 49. This will be allowed if there is technological equivalency between the test on-road engine and the non-road engine families applying the DF values for certification. The DF values derived from on-road engine emission durability test results shall be calculated on the basis of EDP values defined in paragraph 2., Table 1.
- 1.1.1.5. In the case where an engine family uses established technology, an analysis based on good engineering practices may be used in lieu of testing to determine a deterioration factor for that engine family subject to approval of the type approval authority.
- 1.2. DF information in approval applications
 - 1.2.1. Additive DFs shall be specified for each pollutant in an engine family certification application for CI engines not using any after-treatment device.

- 1.2.2. Multiplicative DFs shall be specified for each pollutant in an engine family certification application for CI engines using an after-treatment device.
- 1.2.3. The manufacturer shall furnish the type-approval agency on request with information to support the DF values. This would typically include emission test results, service accumulation test schedule, maintenance procedures together with information to support engineering judgements of technological equivalency, if applicable.
2. Emission durability periods for engines of power bands H to K
- 2.1. Manufacturers shall use the EDP in Table 1 of this paragraph.

Table 1: EDP categories for power bands H to K (hours)

Category (power band)	Useful life (hours) (EDP)
≤ 37 kW (constant speed engines)	3,000
≤ 37 kW (not constant speed engines)	5,000
> 37 kW	8,000

"

Annex 5, in the new inserted Table Part 2., the viscosity at 40 °C, correct the figure "2.3" to read "2.5".

Annex V

ADOPTED AMENDMENTS ON THE BASIS OF INFORMAL DOCUMENT GRPE-53-10
(Regulation No. 110) (see paragraph 28 of this report)

Annex 4D

Insert a new paragraph 2.4., to read:

"2.4. Durability test (continued operation) of pressure regulator:

The regulator shall be able to withstand 50,000 cycles without any failure when tested according to the following procedure. Where the stages of pressure regulation are separate, the service pressure in sub-paragraphs (a) to (f) is considered to be the working pressure of the upstream stage.

- (a) Recycle the regulator for 95 per cent of the total number of cycles at room temperature and at the service pressure. Each cycle shall consist of flow until stable outlet pressure has been obtained, after which the gas flow shall be shut off by a downstream valve within 1 s, until the downstream lock-up pressure has stabilized. Stabilized outlet pressures are defined as set pressure ± 15 per cent for at least 5 s.
- (b) Cycle the inlet pressure of the regulator for 1 per cent of the total number of cycles at room temperature from 100 per cent to 50 per cent of the service pressure. The duration of each cycle shall be no less than 10 s.
- (c) Repeat the cycling procedure of (a) at 120 °C at the service pressure for 1 per cent of the total number of cycles.
- (d) Repeat the cycling procedure of (b) at 120 °C at the service pressure for 1 per cent of the total number of cycles.
- (e) Repeat the cycling procedure of (a) at -40 °C or -20 °C as applicable and 50 per cent of service pressure for 1 per cent of the total number of cycles.
- (f) Repeat the cycling procedure of (b) at -40 °C or -20 °C as applicable and 50 per cent of service pressure for 1 per cent of the total number of cycles.
- (g) At the completion of all tests indicated in sub-paragraphs (a), (b), (c), (d), (e) and (f), the regulator shall be leak proof (see Annex 5B) at the temperatures of -40 °C or -20 °C, as applicable, and at the room temperature and at the temperature of +120 °C."
