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Seventy-fifth session

Geneva, 6-9 June 2017

Report of the Working Party on Pollution and Energy (GRPE) on its seventy-fifth session

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I. Attendance

1. The Working Party on Pollution and Energy (GRPE) held its seventy-fifth session from 6 to 9 June 2017, with Mr. A. Rijnders (Netherlands) as Chair. Experts from the following countries participated in the work following Rule 1(a) of the Rules of Procedure of the World Forum for Harmonization of Vehicle Regulations (WP.29) (TRANS/WP.29/690, as amended): Australia, Austria; Canada; China; Czech Republic; France; Germany; Hungary; India; Italy; Japan; Netherlands; Poland; Republic of Korea (Korea); Russian Federation; Spain; Sweden; Switzerland; United Kingdom of Great Britain and Northern Ireland (UK) and the United States of America. Experts from the European Commission (EC) also participated. Experts from the following non-governmental organizations took part in the session: Association for Emissions Control by Catalyst (AECC); European Association of Automobile Suppliers (CLEPA/MEMA/JAPIA); European Federation for Transport and Environment (T&E); European Garage Equipment Association (EGEA); International Association for Natural Gas Vehicles (IANGV/NGV Global); International Motor Vehicle Inspection Committee (CITA); International Motorcycle Manufacturers Association (IMMA); International Organization of Motor Vehicle Manufacturers (OICA) and The European Association of Internal Combustion Engine Manufacturers (EUROMOT).

II. Adoption of the agenda (agenda item 1)

Documentation: ECE/TRANS/WP.29/GRPE/2017/8 and Add.1
Informal documents GRPE-75-01, GRPE-75-04 and
GRPE-75-21

2. GRPE adopted the provisional agenda of its seventy-fifth session (ECE/TRANS/WP.29/GRPE/2017/8 and Add.1), as updated and consolidated in GRPE-75-21, including the informal documents tabled for the session. GRPE took note of GRPE-75-01 on the organization of GRPE Informal Working Group (IWG) meetings held during the week.

3. The informal documents distributed during the GRPE session are listed in Annex I. Annex II contains a list of the informal meetings held in conjunction with the GRPE session. Annex III lists GRPE IWGs, task forces and subgroups, giving details on their Chairs, Secretaries and the end of mandates.

4. The secretariat introduced GRPE-75-04, announcing that the next GRPE session would take place on 9-12 January 2018 and recalling the corresponding deadline (9 October 2017) for the submission of official documents. The Chairs and Secretaries of IWGs were invited to approach the secretariat to define the calendar of meetings of IWGs for the January 2018 GRPE session.

III. Report on the last session of the World Forum for Harmonization of Vehicle Regulations (WP.29) (agenda item 2)

Documentation: ECE/TRANS/WP.29/1129
Informal document GRPE-75-05

5. The secretariat introduced GRPE-75-05 and reported on relevant GRPE items discussed during the 171st session of the World Forum. For more details, see ECE/TRANS/WP.29/1129.

IV. Light vehicles (agenda item 3)

A. Regulations Nos. 68 (Measurement of the maximum speed, including electric vehicles), 83 (Emissions of M₁ and N₁ vehicles), 101 (CO₂ emissions/fuel consumption) and 103 (Replacement pollution control devices)

6. GRPE did not receive any new proposal to amend Regulations Nos. 68, 83, 101 and 103.

B. Global Technical Regulation No. 15 on Worldwide harmonized Light vehicles Test Procedure (WLTP)

Documentation: ECE/TRANS/WP.29/GRPE/2017/9
Informal documents GRPE-75-07, GRPE-75-16, GRPE-75-18,
GRPE-75-20, GRPE-75-22 and GRPE-75-23

7. The Chair of the IWG on the Worldwide harmonized Light vehicles Test Procedure (WLTP) reported on the ongoing Phase 2 activities under each of the task forces (GRPE-75-20). He anticipated that the IWG on WLTP may need some additional time to finalize all Phase 2 activities due to the complex and heavy workload to be carried out; he mentioned that GRPE will be informed accordingly in the following sessions. He requested guidance from GRPE on the preferred approach for WLTP construction either in a single UN global technical regulation (GTR) or separate GTRs.

8. The experts from EC and India expressed their preference to use separate GTRs in order to give more flexibility to Contracting Parties to the 1998 Agreement when transposing into national/regional legislation.

9. GRPE agreed on the general principle to have several GTRs in the framework of WLTP so that the 1998 Agreement is more attractive, and to then attempt to combine those GTRs when WLTP is transposed into Regulations under the 1958 Agreement.

10. The drafting coordinator of the IWG on WLTP presented ECE/TRANS/WP.29/GRPE/2017/9 on amendments to GTR No. 15 on WLTP. He also presented GRPE-75-22 introducing some changes to ECE/TRANS/WP.29/GRPE/2017/9 and he referred to GRPE-75-23 as a consolidated version of both documents. He introduced GRPE-75-07 as technical report on the development of such amendments to GTR No. 15.

11. GRPE adopted ECE/TRANS/WP.29/GRPE/2017/9 as amended by Annex IV to this report and requested the secretariat to submit it to WP.29 and the Executive Committee of the 1998 Agreement (AC.3) for consideration and vote at their November 2017 sessions as draft Amendment 3 to GTR No. 15 on WLTP. GRPE also adopted the technical report (GRPE-75-07) as reproduced in Annex V to this report and requested the secretariat to submit it to WP.29 and AC.3 for consideration and vote at their November 2017 sessions.

12. As leader of the task force on evaporative emissions, the expert from Japan introduced GRPE-75-16 on a first draft of amendments to the new GTR on evaporative emission test procedure for WLTP (WLTP EVAP). She expressed the intention of the IWG on WLTP to continue working on the proposal to submit an official document together with a technical report for consideration at the next GRPE session in January 2018.

13. As leader of the task force on the transposition of WLTP into the 1958 Agreement, the expert from EC presented GRPE-75-18 on an alternative transposition route. He explained that the idea of a new Regulation on WLTP (Type 1 and Type 4 tests) including

regional levels and the most stringent level (Level 2, which would be the only one subject to mutual recognition) remained the same as agreed in the past. He proposed to change the original plan to develop a second new Regulation for other tests beyond Types 1 and 4 and to use existing Regulation No. 83 instead. He expressed the task force's intention to do it through a new series of amendments (08) that would adapt Regulation No. 83 to the European requirements (e.g. Real Driving Emissions (RDE)) and that would refer to the new Regulation on WLTP to gain approval for tests Types 1 and 4. He emphasized that in this way Regulation No. 83 would stay alive and no Contracting Parties would have to cease applying it. He mentioned some ongoing discussions regarding In Service Conformity (ISC) and the scope of the 1958 Agreement.

14. The expert from OICA expressed his positive opinion on the solution found and encouraged GRPE to start thinking of how to deal with CO₂ emissions and energy consumption and of whether Regulations Nos. 83 and 101 should be kept separate or should be combined in line with the WLTP approach. Following a question by the expert from India on the possibility to include RDE in WLTP, he preferred to get an opinion from OICA and to consider first the challenges to harmonize RDE taking into account the sensitivity between authorities.

15. GRPE endorsed the new transposition route as proposed in GRPE-75-18 and agreed to resume discussion at its next session on the basis of the work carried out by the task force. The Chair of GRPE expressed his intention to seek the consent of WP.29 on this proposed route at its forthcoming session in June 2017.

16. GRPE acknowledged the progress made by the IWG on WLTP and noted the request for a meeting room for one day during the GRPE week in January 2018.

V. Heavy duty vehicles (agenda item 4)

A. Regulations Nos. 49 (Emissions of compression ignition and positive ignition (LPG and CNG) engines) and 132 (Retrofit Emissions Control devices (REC))

Documentation: ECE/TRANS/WP.29/GRPE/2017/6
Informal documents GRPE-74-08, GRPE-75-06, GRPE-75-26 and GRPE-75-27

17. The expert from OICA presented ECE/TRANS/WP.29/GRPE/2017/6 on a proposal for a new Supplement to the 06 series of amendments to Regulation No. 49 in order to align it with the current state of the legislation of the European Union (EU). He recalled that ECE/TRANS/WP.29/GRPE/2017/6 had already been tabled at the last GRPE session. He also presented GRPE-75-26 and GRPE-75-27 introducing some changes to ECE/TRANS/WP.29/GRPE/2017/6. He explained that GRPE-75-26 aimed to fix the generally non-feasible urban window requirement to ensure the feasibility of the Portable Emissions Measurement System (PEMS) test and that GRPE-75-27 intended to introduce missing On-Board Diagnostic systems (OBD) requirements.

18. The expert from Japan made a general comment on differences between traffic situations and he underlined the necessity to further discuss this topic. The expert from EC expressed his readiness to open discussions in the case that Japan would decide to become a Contracting Party to Regulation No. 49 in the future.

19. The expert from IANGV/NGV Global expressed his support to the proposals presented by OICA as GRPE-75-27 was fixing some concerns about the testing methodology.

20. The expert from OICA recalled GRPE-74-08 presented last session and aimed at correcting editorial errors in the 05 and 06 series of amendments to Regulation No. 49. He requested GRPE to consider the possibility to include GRPE-74-08 as part of the package to be voted of amendments to Regulation No. 49 at this session.

21. GRPE adopted ECE/TRANS/WP.29/GRPE/2017/6 amended by GRPE-74-08, GRPE-75-26 and GRPE-75-27 as reproduced in Addendum 1 to this report and requested the secretariat to submit it to WP.29 and the Administrative Committee of the 1958 Agreement (AC.1) for consideration and vote at their November 2017 sessions as draft Supplement 5 to the 06 series of amendments to Regulation No. 49.

22. GRPE also adopted GRPE-74-08 as reproduced in Annex VI and requested the secretariat to submit it to WP.29 and AC.1 for consideration and vote at their November 2017 sessions as draft Supplement 9 to the 05 series of amendments to Regulation No. 49.

23. The expert from Switzerland presented GRPE-75-06 on manipulations on EURO V and VI trucks by aftermarket suppression of AdBlue injection. He explained that the Swiss Authorities had decided to act after some previous cases in other countries and that suspect vehicles had been immobilized and inspected. He mentioned that 100 manipulated vehicles had been discovered nationwide since February 2017. He underlined that only manipulated EURO V vehicles had been identified and no manipulated EURO VI vehicles had been detected so far due to the lack of access to the emission control software. He invited Contracting Parties to address the five questions listed in GRPE-75-06 in order to exchange information on manipulation detection methods and enforcement strategies. Following a question raised by the expert from Italy, he clarified that the registration documents of the manipulated trucks had not yet been used to contact corresponding authorities.

24. The expert from the European Automobile Manufacturers Association (ACEA) expressed his readiness to share with GRPE a study prepared by his organization on this topic including information on used devices and geographical spread.

25. The experts from Austria, Canada, France, Sweden and UK reported similar concerns and investigations in their respective countries and showed their interest to exchange views on this subject.

26. The Chair of GRPE invited all stakeholders to keep on sharing information on this important issue. He also invited the expert from Switzerland to bring this topic to WP.29 and to present an updated report at the next GRPE session in January 2018.

B. Global Technical Regulations Nos. 4 (World-wide harmonized Heavy Duty Certification procedure (WHDC)), 5 (World-Wide harmonized Heavy duty On-Board Diagnostic systems (WWH-OBD)) and 10 (Off-Cycle Emissions (OCE))

27. GRPE did not receive any new proposal to amend GTRs Nos. 4, 5 and 10.

VI. Regulations Nos. 85 (Measurement of the net power), 115 (LPG and CNG retrofit systems), 133 (Recyclability of motor vehicles) and 143 (Heavy Duty Dual-Fuel Engine Retrofit Systems (HDDF-ERS)) (agenda item 5)

Documentation: Informal documents GRPE-75-12 and GRPE-75-13

28. The expert from OICA presented GRPE-75-12 to correct an error identified in a formula in Regulation No. 85.

29. The expert from UK presented GRPE-75-13 on the need to clarify the wording of the determination of the net power for electric motors in Regulation No. 85 and he recommended a possible solution.

30. The Chair of GRPE invited the experts from OICA and UK to combine both proposals and to submit an official working document for consideration at the next GRPE session in January 2018.

VII. Agricultural and forestry tractors, non-road mobile machinery (agenda item 6)

A. Regulations Nos. 96 (Diesel emission (agricultural tractors)) and 120 (Net power of tractors and non-road mobile machinery)

Documentation: Informal documents GRPE-75-09, GRPE-75-10, GRPE-75-11 and GRPE-75-25

31. The expert from EC reminded GRPE about the need to align Regulation No. 96 with the new EU Regulation (2016/1628) on Non-Road Mobile Machinery (NRMM) engines (GRPE-75-09). He presented GRPE-75-10 to introduce a first draft of the 05 series of amendments to Regulation No. 96 available as GRPE-75-11. He explained that GRPE-75-11 contained technical aspects, but not yet administrative procedures. He expressed his intention to submit an updated proposal as an official document for the GRPE January 2018 session. He expressed his intention to present a first draft of amendments to Regulations Nos. 120 and 132 at the next GRPE session to also align both Regulations with the new EU Regulation. He invited all stakeholders to provide comments and suggestions on GRPE-75-11 using the form available in GRPE-75-25. The experts from Italy and EUROMOT expressed their continued support to these activities.

32. GRPE agreed to resume discussion at the next GRPE session on the basis of forthcoming proposals.

B. Global Technical Regulation No. 11 (Non-road mobile machinery engines)

33. GRPE did not receive any new proposal to amend GTR No. 11.

VIII. Particle Measurement Programme (PMP) (agenda item 7)

Documentation: Informal document GRPE-75-17

34. The Chair of the IWG on Particle Measurement Programme (PMP) presented a status report on the activities of the group on exhaust and non-exhaust particle emissions (GRPE-75-17). He explained the scope and the suggested setup of the Round Robin test to assess differences and uncertainties in the measurement of exhaust particles with a size below 23 nanometre. He informed GRPE about the activities on raw exhaust sampling, Round Robin test for Particle Number Counter calibration, Horizon 2020 projects and gas engine testing. He mentioned some communications between the IWGs on PMP and WLTP on possible cooperation on low temperature testing. Regarding non-exhaust particle

emissions, he focused on the three-step approach for the development of the methodology for brake wear particles measurement (braking test cycle representative of real-world conditions, methodology for sampling brake wear particles, methodology for brake wear particles measurement and characterization). He announced the group's target to finalize the development of the braking test cycle by the end of 2017. He underlined that a brake dynamometer test rig appeared to be the best solution of the three sampling methods considered.

35. GRPE acknowledged the progress made by the IWG on PMP and noted the request for a meeting room for half a day during the GRPE week in January 2018.

IX. Motorcycles and mopeds (agenda item 8)

A. Regulations Nos. 40 (Emission of gaseous pollutants by motorcycles) and 47 (Emission of gaseous pollutants of mopeds)

36. GRPE did not receive any new proposal to amend Regulations Nos. 40 and 47.

B. Environmental and Propulsion Performance Requirements (EPPR) for L-category vehicles

Documentation: Informal document GRPE-75-24

37. The Chair of the IWG on Environmental and Propulsion Performance Requirements for L-category vehicles (EPPR) presented a status report (GRPE-75-24) on the activities of the group. He mentioned that the first priority was the development of amendments to GTR No. 2. He explained that the progress was slower than anticipated due to regional differences so that a first draft was not yet ready for this session but planned to be submitted at the next GRPE session in January 2018. He sought guidance from GRPE on the temperature units to be used. He underlined that the work on On-Board Diagnostic systems (OBD) Stage II would begin in year 2018 after the work progress on amendments to GTR No. 2.

38. The drafting coordinator of the IWG on WLTP highlighted the general use of °C in WLTP development with a few exceptions for specific equations in which Kelvin is required.

39. The Chair of GRPE advised to be in line with WLTP and recommended the general use of °C with the flexibility to use Kelvin when necessary. GRPE acknowledged the progress made by the IWG on EPPR and noted the request for a meeting room for one day during the GRPE week in January 2018.

C. Global Technical Regulation No. 2 (World-wide Motorcycle emissions Test Cycle (WMTC))

40. GRPE did not receive any new proposal to amend GTR No. 2.

X. Electric Vehicles and the Environment (EVE) (agenda item 9)

Documentation: Informal document GRPE-75-28

41. The Chair of the IWG on Electric Vehicles and the Environment (EVE) presented a status report on the ongoing activities of the group (GRPE-75-28) under the three assigned areas of work. First, he explained the ongoing work on GTR development for the test procedure to determine power of electrified vehicles on the basis of the International Organization for Standardization (ISO) method. He mentioned the priority given to the reference method, whereas a decision on whether to also develop the candidate method would be taken later. Second, he reported on the continuous research on battery durability and referred to activities from Canada and the Joint Research Centre (JRC) on battery life modelling. Third, he informed GRPE that the IWG on EVE had contacted the Chair and the Secretary of the Group of Experts on Energy Efficiency (GEEE) to seek their partnership on the project to assess upstream emissions from electric vehicles. Finally, he underlined the regular interactions between EVE and WLTP IWGs to ensure that work would be complimentary and on time as well as to avoid duplication of efforts.

42. GRPE acknowledged the progress made by the IWG on EVE and noted the request for a meeting room for half a day during the GRPE week in January 2018.

XI. Mutual Resolution No. 2 (M.R.2) (agenda item 10)

43. GRPE did not receive any new proposal to amend M.R.2.

XII. International Whole Vehicle Type Approval (IWVTA) (agenda item 11)

Documentation: Informal document GRPE-75-08

44. In the absence of Mr. M. Robledo, the Chair of GRPE announced on his behalf his decision to resign as GRPE Ambassador on IWVTA after this GRPE session. He thanked Mr. M. Robledo for his efforts done within the last years and for preparing GRPE-75-08 for this session. He highlighted the relevance of the role of the GRPE Ambassador particularly at the moment when WLTP would be transposed into the 1958 Agreement and then be integrated as part of the new Regulation on IWVTA.

45. In the absence of candidates from Contracting Parties, GRPE elected Mr. W. Coleman from OICA as the new GRPE Ambassador on IWVTA. The Chair of GRPE thanked Mr. Coleman for his commitment to take over this task.

46. GRPE noted that draft Revision 3 of the 1958 Agreement was in the process of ratification (ECE/TRANS/WP.29/1126, paras. 64 and 65) and that the date of entry into force of Revision 3 would be 14 September 2017. GRPE also noted that, at the June 2017 session of WP.29, delegates would consider the following documents on IWVTA: (a) revised general guidelines for UN Regulatory Procedures and Transitional Provisions in UN Regulations (ECE/TRANS/WP.29/2017/67), (b) a first draft text of Regulation No. 0 on IWVTA (ECE/TRANS/WP.29/2017/104), (c) an explanatory document on Regulation No. 0 (ECE/TRANS/WP.29/2017/54), and (d) a question and answer document on Revision 3 of the 1958 Agreement (ECE/TRANS/WP.29/2017/55). Interested experts were invited to consult these documents.

XIII. Vehicles Interior Air Quality (VIAQ) (agenda item 12)

Documentation: ECE/TRANS/WP.29/GRPE/2017/10
Informal documents GRPE-75-02-Rev.1, GRPE-75-03-Rev.1,
GRPE-75-14 and GRPE-75-19

47. The Chair of the IWG on Vehicles Interior Air Quality (VIAQ) presented a status report on the ongoing activities of the group (GRPE-75-19). He recalled that the original mandate of the group would end in November 2017. He highlighted the conclusion of the work by the tabled proposal on a new Mutual Resolution on recommendations to harmonize test procedures of interior air emissions generated from interior materials (ECE/TRANS/WP.29/GRPE/2017/10). He presented GRPE-75-02-Rev.1 introducing some changes to ECE/TRANS/WP.29/GRPE/2017/10 and he referred to GRPE-75-03-Rev.1 as a consolidated version of both documents. He requested an extension of the mandate of the IWG on VIAQ until November 2020 to expand the work to consider not only emissions generated by interior materials but also gases from other sources that enter into the vehicle cabin. He introduced a first draft of the updated terms of reference and rules of procedure (GRPE-75-14) for this second stage of the work and expressed the group's intention to submit a final version at the next GRPE session in January 2018. For this second stage of the work, he noted that the Russian Federation would chair the IWG, together with Korea as Vice-Chair and OICA for the Secretary. He explained that the endorsement by GRPE at this session of the extension of the mandate of the IWG on VIAQ would allow the group to continue working without any interruption between the end of the current mandate and the next GRPE session in January 2018. He invited all Contracting Parties to be involved in the new stage of work.

48. As Chair for the new stage of the IWG on VIAQ, the expert from the Russian Federation highlighted the existing standards on VIAQ in his country. He expressed the willingness to lead the activities of the new stage of the group.

49. GRPE adopted ECE/TRANS/WP.29/GRPE/2017/10 amended by GRPE-75-02-Rev.1 as reproduced in Addendum 2 to this report and requested the secretariat to submit it to WP.29 and AC.3 for consideration at their November 2017 sessions as draft Mutual Resolution No. 3.

50. GRPE endorsed the extension of the mandate of the IWG on VIAQ until November 2020 subject to the final endorsement of WP.29 at its June 2017 session. GRPE noted that the IWG on VIAQ would submit the final version of the terms of reference and rules of procedure as an informal document, to be attached to the report in case of adoption, at the next GRPE session.

51. GRPE acknowledged the progress made by the IWG on VIAQ and noted the request for a meeting room for half a day during the GRPE week in January 2018.

XIV. Exchange of information on emission requirements (agenda item 13)

Documentation: Informal document GRPE-75-15

52. The expert from Japan presented GRPE-75-15 on the future policy for motor vehicle emission reduction in his country. He gave an overview of the report to the Minister of the Environment by the Central Environment Council on 31 May 2017. In his presentation, he covered measures to reduce: (i) fuel evaporative emissions, (ii) Particulate Matter (PM) emissions from gasoline direct injection vehicles, and (iii) two-wheeled vehicle emissions. He also addressed future issues for discussion.

53. The Chair of GRPE welcomed the presentation and invited Contracting Parties to continue this exercise of exchange of information on emissions requirements in the next sessions.

XV. Election of officers (agenda item 14)

54. In compliance with Rule 37 of the Rules of Procedures (TRANS/WP.29/690, Amends. 1 and 2) GRPE unanimously elected Mr. A. Rijnders (Netherlands) as Chair of GRPE for the sessions in the year 2018. No new Vice-Chair was elected in the absence of candidates.

XVI. Any other business (agenda item 15)

55. GRPE did not receive any information for this item.

XVII. Provisional agenda for the next session

A. Next GRPE session

56. The next GRPE session, including the IWG meetings, is scheduled to be held in Geneva, Palais des Nations, starting on Monday, 8 January 2018, from 2.30 p.m. until Friday, 12 January 2018, at 12.30 p.m., subject to confirmation by the secretariat (see GRPE-76-01, forthcoming). Interpretation services would be provided from 9 January (2.30 p.m.) to 12 January (12.30 p.m.) 2018.

B. Provisional agenda for the next proper GRPE session

57. GRPE agreed on the following provisional agenda for its next session:

1. Adoption of the agenda.
2. Report on the last sessions of the World Forum for Harmonization of Vehicle Regulations (WP.29).
3. Light vehicles:
 - (a) Regulations Nos. 68 (Measurement of the maximum speed, including electric vehicles), 83 (Emissions of M₁ and N₁ vehicles), 101 (CO₂ emissions/fuel consumption) and 103 (Replacement pollution control devices);
 - (b) Global Technical Regulations Nos. 15 (Worldwide harmonized Light vehicles Test Procedures (WLTP)) and 19 (Evaporative emission test procedure for the Worldwide harmonized Light vehicle Test Procedure (WLTP EVAP)).
4. Heavy duty vehicles:
 - (a) Regulations Nos. 49 (Emissions of compression ignition and positive ignition (LPG and CNG) engines) and 132 (Retrofit Emissions Control devices (REC));
 - (b) Global Technical Regulations Nos. 4 (World-wide harmonized Heavy duty Certification procedure (WHDC)), 5 (World-Wide harmonized Heavy duty On-Board Diagnostic systems (WWH-OBD)) and 10 (Off-Cycle Emissions (OCE)).
5. Regulations Nos. 85 (Measurement of the net power), 115 (LPG and CNG retrofit systems), 133 (Recyclability of motor vehicles) and 143 (Heavy Duty Dual-Fuel Engine Retrofit Systems (HDDF-ERS)).

6. Agricultural and forestry tractors, non-road mobile machinery:
 - (a) Regulations Nos. 96 (Diesel emission (agricultural tractors)) and 120 (Net power of tractors and non-road mobile machinery);
 - (b) Global Technical Regulation No. 11 (Non-road mobile machinery engines).
7. Particle Measurement Programme (PMP).
8. Motorcycles and mopeds:
 - (a) Regulations Nos. 40 (Emission of gaseous pollutants by motor cycles) and 47 (Emission of gaseous pollutants of mopeds);
 - (b) Environmental and Propulsion Performance Requirements (EPPR) for L-category vehicles;
 - (c) Global Technical Regulations Nos. 2 (World-wide Motorcycle emissions Test Cycle (WMTC)), 17 (Crankcase and evaporative emissions of L-category vehicles) and 18 (On-Board Diagnostic (OBD) systems for L-category vehicles).
9. Electric Vehicles and the Environment (EVE).
10. Mutual Resolution No. 2 (M.R.2).
11. International Whole Vehicle Type Approval (IWVTA).
12. Vehicles Interior Air Quality (VIAQ).
13. Exchange of information on emission requirements.
14. Any other business.

C. Informal meetings scheduled to be held in conjunction with the next GRPE session

58. The informal meetings were scheduled to be held as follows, subject to confirmation:

<i>Date</i>	<i>Group</i>	<i>Acronym</i>	<i>Time</i>
Monday, 8 January 2018	Electric Vehicles and the Environment	EVE	2.30 p.m. – 5.30 p.m.
Tuesday, 9 January 2018	Worldwide harmonized Light vehicles Test Procedure	WLTP	9.30 a.m. – 12.30 p.m. 2.30 p.m. – 5.30 p.m.
Wednesday, 10 January 2018	Particle Measurement Programme	PMP	9.30 p.m. – 12.30 p.m.
	Vehicle Interior Air Quality	VIAQ	2.30 p.m. – 5.30 p.m.
	Environmental and Propulsion Performance Requirements of L-category vehicles	EPPR	9.30 a.m. – 12.30 p.m. 2.30 p.m. – 5.30 p.m.

59. The agendas of these meetings will be prepared by the respective Secretaries and distributed to the members of each group prior to each meeting.

Annex I

List of informal documents distributed without an official symbol

GRPE-75-	Transmitted by	Title	Follow-up
1	Secretariat	Informal meetings in conjunction with the GRPE (proper) session: schedule and rooms	A
2-Rev.1	VIAQ	Proposal for amendments to ECE/TRANS/WP.29/GRPE/2017/10 on a new Mutual Resolution on VIAQ	B
3-Rev.1	VIAQ	Proposal for amendments to ECE/TRANS/WP.29/GRPE/2017/10 on a new Mutual Resolution on VIAQ (Consolidated version)	A
4	Secretariat	General information	A
5	Secretariat	Highlights of the last WP.29 session (March 2017)	A
6	Switzerland	Status report from Swiss heavy-duty truck controls	A
7	WLTP	Technical report on the development of Amendment 3 to global technical regulation No. 15	B
8	GRPE Ambassador	Report by the GRPE Ambassador on IWTA	A
9	EC	Alignment of Regulation No. 96 to EU Stage V	A
10	EC	Proposal for a new 05 series of amendments to Regulation No. 96	A
11	EC	05 series of amendments to Regulation No. 96	A
12	OICA	Proposal for Supplement 8 to the original version of Regulation No. 85 (Measurement of the net power)	A
13	UK	Effects of Thermal Loading on the Determination of Net Power for Electric Motors	A
14	VIAQ	Draft Terms of reference and rules of procedure for the IWG on VIAQ - Second stage	A
15	Japan	Future Policy for Motor Vehicle Emission Reduction (Thirteenth Report)	A
16	WLTP	Draft Amendment 1 to UN GTR on WLTP EVAP	A
17	PMP	Status report	A
18	EC	Transposition of gtr No. 15 on WLTP into UN Regulations under the 1958 Agreement	A
19	VIAQ	Status report	A
20	WLTP	Status report	A
21	Secretariat	Updated provisional agenda (including all informal documents)	A
22	WLTP	Proposal for amendments to ECE/TRANS/WP.29/GRPE/2017/9	B
23	WLTP	Proposal for Amendment 3 to global technical regulation No. 15 (Worldwide harmonized Light vehicles Test Procedures (WLTP))	A
24	EPPR	Status report	A
25	EC	Comments to GRPE-75-11	A
26	OICA	Proposal for amendments to ECE/TRANS/WP.29/GRPE/2017/6 on a new Supplement to the 06 series of amendments to Regulation No. 49	B
27	OICA	Proposal for amendments to ECE/TRANS/WP.29/GRPE/2017/6 on a new Supplement to the 06 series of amendments to Regulation No. 49	B
28	EVE	Status report	A
GRPE-74-08	OICA	Proposal for a new Supplement to the 05 and 06 series of amendments to Regulation No. 49	B

Notes:

- A Consideration by GRPE completed or to be superseded.
B Adopted and submitted to WP.29.

Annex II

Informal meetings held in conjunction with the GRPE session

<i>Date</i>	<i>Time</i>	<i>Group</i>	<i>Acronym</i>
6 June 2017	10:30 a.m. - 1:30 p.m.	Worldwide harmonized Light vehicles Test Procedure	WLTP
	2:30 p.m. - 5:30 p.m.	Worldwide harmonized Light vehicles Test Procedure	WLTP
7 June 2017	9:30 a.m. - 12:30 p.m.	Electric Vehicles and the Environment	EVE
	9:30 a.m. - 12:30 p.m.	Environmental and Propulsion Performance Requirements of L-category vehicles	EPPR
	2:30 p.m. - 5:30 p.m.	Environmental and Propulsion Performance Requirements of L-category vehicles	EPPR

Annex III

List of GRPE informal working groups, task forces and subgroups

<i>Name (Acronym) (Status)</i>	<i>Chair or Co-chairs</i>	<i>Secretaries</i>	<i>End of mandate</i>
Environmental and Propulsion Performance Requirements of L-category vehicles (EPPR) (group)	Adolfo Perujo, Adolfo.PERUJO@ec.europa.eu	Daniela Leveratto, d.leveratto@immamotorcycles.org Hardik Makhija, hardik@siam.in	December 2020
Electric Vehicles and the Environment (EVE) (group)	Michael Olechiw, Olechiw.Michael@epamail.epa.gov Chen Chunmei (vice-Chair), chencm@miit.gov.cn Kazuyuki Narusawa (vice-Chair), narusawa@ntsel.go.jp	Andrew Giallonardo, Andrew.Giallonardo@ec.gc.ca	November 2019
Particle Measurement Programme (PMP) (group)	Giorgio Martini, giorgio.martini@jrc.ec.europa.eu	Caroline Hosier, chosier@ford.com	June 2019
Vehicle Interior Air Quality (VIAQ) (group)	Jong Soon Lim, jongsoon@ts2020.kr Yunshan GE (vice-Chair), geyunshan@163.com	Andreas Wehrmeier, andreas.wehrmeier@bmw.de	November 2020
Worldwide harmonized Light vehicles Test Procedure (WLTP) – Phase 2 (group)	Robertus Cuelenaere, rob.cuelenaere@tno.nl Daisuke Kawano (vice-Chair), kawano@ntsel.go.jp	Noriyuki Ichikawa (co-Technical Secretary), noriyuki_ichikawa@mail.toyota.co.jp Markus Bergmann (co-Technical Secretary), markus.bergmann@audi.de	December 2019

Annex IV

Amendments to ECE/TRANS/WP.29/GRPE/2017/9

Adopted on the basis of GRPE-75-22 (see para. 11)

In ECE/TRANS/WP.29/GRPE/2017/9,

Part II, Text of the global technical regulation,

Paragraph 3.5.2., amend to read:

"3.5.2. "Category 1 vehicle" means a power-driven vehicle with four or more wheels designed and constructed primarily for the carriage of one or more persons."

Paragraph 3.5.5., amend to read:

"3.5.5. "Category 2 vehicle" means a power-driven vehicle with four or more wheels designed and constructed primarily for the carriage of goods. This category shall also include:

- (a) Tractive units;
- (b) Chassis designed specifically to be equipped with special equipment."

Annex 2, paragraph 2.(g), amend to read:

"(g) n_{max}

$n_{max1} = n_{95_high}$, the ~~minimum~~ **maximum** engine speed where 95 per cent of rated power is reached, min^{-1} ;

If n_{95_high} cannot be determined because the engine speed is limited to a lower value n_{lim} for all gears and the corresponding full load power is higher than 95 per cent of rated power, n_{95_high} shall be set to n_{lim} .

~~If n_{max_95} is less than 65 per cent of n_{rated} , n_{max_95} shall be set to 65 per cent of n_{rated} ;~~

~~If 65 per cent of $(n_{rated} \times (n/v)_3 / (n/v)_2) < 1.1 \times (n_{idle} + 0.125 \times (n_{rated} - n_{idle}))$, n_{max_95} shall be set to:~~

$$1.1 \times (n_{idle} + 0.125 \times (n_{rated} - n_{idle})) \times (n/v)_2 / (n/v)_3$$

$$n_{max}(ng_{vmax}) = (n/v)(ng_{vmax}) \times v_{max,cycle}$$

$$n_{max2} = (n/v)(ng_{vmax}) \times v_{max,cycle}$$

$$n_{max3} = (n/v)(ng_{vmax}) \times v_{max,vehicle}$$

where:

ng_{vmax} is defined in paragraph 2.(i) of this annex;

$v_{max,cycle}$ is the maximum speed of the vehicle speed trace according to Annex 1, km/h;

$v_{max,vehicle}$ is the maximum speed of the vehicle according to paragraph 2.(i) of this annex, km/h;

$(n/v)(ng_{vmax})$ is the ratio obtained by dividing engine speed n by the vehicle speed v for gear ng_{vmax} , $\text{min}^{-1}/(\text{km/h})$;

n_{\max} is the maximum of $n_{\max1}$, $n_{\max2}$ and $n_{\max3}$, $n_{\max95}$ and $n_{\max}(ng_{v\max}) \cdot \min^{-1}$."

Annex 2, paragraph 2.(h), amend to read:

"(h) $P_{\text{wot}}(n)$, the full load power curve over the engine speed range.

$(n/v)(ng_{v\max})$ is the ratio obtained by dividing the engine speed n by the vehicle speed v for the gear $ng_{v\max}$, $\min^{-1}/(\text{km/h})$;

The power curve shall consist of a sufficient number of data sets (n , P_{wot}) so that the calculation of interim points between consecutive data sets can be performed by linear interpolation. Deviation of the linear interpolation from the full load power curve according to Regulation No. 85 shall not exceed 2 per cent. The first data set shall be at n_{\min_drive} of $n_{\text{gear}} > 2$ (see (k) below) or lower. The last data set shall be at **n_{\max} or higher engine speed.** ~~n_{rated} or n_{\max} or $(n/v)(ng_{v\max}) \times v_{\max}$, whichever is greater.~~ Data sets need not be spaced equally. The full load power at engine speeds not covered by Regulation No. 85 shall be determined according to the method described in Regulation No. 85;"

Annex 2, paragraph 2.(i), amend to read:

"(i) **Determination of $ng_{v\max}$ and v_{\max}**

$ng_{v\max}$, the gear in which the maximum vehicle speed is reached and shall be determined as follows:

If $v_{\max}(ng) \geq v_{\max}(ng-1)$ and $v_{\max}(ng-1) \geq v_{\max}(ng-2)$, then:

$ng_{v\max} = ng$ and $v_{\max} = v_{\max}(ng)$.

If $v_{\max}(ng) < v_{\max}(ng-1)$ and $v_{\max}(ng-1) \geq v_{\max}(ng-2)$, then:

$ng_{v\max} = ng-1$ and $v_{\max} = v_{\max}(ng-1)$,

otherwise, $ng_{v\max} = ng-2$ and $v_{\max} = v_{\max}(ng-2)$

where:

$v_{\max}(ng)$ is the vehicle speed at which the required road load power equals the available power P_{wot} in gear ng (see Figure A2/1a).

$v_{\max}(ng-1)$ is the vehicle speed at which the required road load power equals the available power P_{wot} in the next lower gear (**gear $ng-1$**). (See Figure A2/1b).

$v_{\max}(ng-2)$ is the vehicle speed at which the required road load power equals the available power P_{wot} in the gear $ng-2$.

Vehicle speed values rounded to one place of decimal shall be used for the determination of v_{\max} and $ng_{v\max}$.

The required road load power, kW, shall be calculated using the following equation:

$$P_{\text{required}} = \frac{f_0 \times v_{\max} + f_1 \times v_{\max}^2 + f_2 \times v_{\max}^3}{3600}$$

where:

v_{\max} is stands for the vehicle speed specified above, km/h.

The available power at vehicle speed v_{\max} in gear ng, ~~or gear ng-1~~ **or gear ng-2** may be determined from the full load power curve, $P_{\text{wor}}(n)$, by using the following equations:

$$n_{\text{ng}} = (n/v)_{\text{ng}} \times v_{\max}(\text{ng});$$

$$n_{\text{ng-1}} = (n/v)_{\text{ng-1}} \times v_{\max}(\text{ng-1});$$

$$\mathbf{n_{\text{ng-2}} = (n/v)_{\text{ng-2}} \times v_{\max}(\mathbf{ng-2}),}$$

and by reducing the power values of the full load power curve by 10 per cent.

The method described above shall be extended to even lower gears, i.e. ng- 3, ng-4, etc. if necessary.

If, for the purpose of limiting maximum vehicle speed, the maximum engine speed ~~in the highest gear~~ is limited to n_{lim} which is lower than the engine speed corresponding to the intersection of the road load power curve and the available power curve, then:

$$ng_{\text{vmax}} = ng_{\text{max}} \text{ and } v_{\text{max}} = n_{\text{lim}} / ((n/v) \times (ng_{\text{max}})).$$

..."

Annex 2, paragraph 2.(j), amend to read:

"(j) Exclusion of a crawler gear

Gear 1 may be excluded at the request of the manufacturer if all of the following conditions are fulfilled:

~~(1) The vehicle does not have a dual range transmission;~~

(21) The vehicle family is homologated to tow a trailer;

~~(3) $((n/v)_1 / (n/v)(ng_{\text{vmax}})) \times (v_{\text{max}} \times (n/v)(ng_{\text{vmax}}) / n_{\text{rated}}) > 7;$~~

(2) $(n/v)_1 \times (v_{\text{max}} / n_{95_high}) > 6.74;$

~~(4) $((n/v)_2 / (n/v)(ng_{\text{vmax}})) \times (v_{\text{max}} \times (n/v)(ng_{\text{vmax}}) / n_{\text{rated}}) > 4;$~~

(3) $(n/v)_2 \times (v_{\text{max}} / n_{95_high}) > 3.85;$

~~(54)~~ The vehicle, having a mass m_t as defined in the equation below, is able to pull away from standstill within 4 seconds, on an uphill gradient of at least 12 per cent, on five separate occasions within a period of 5 minutes.

$$m_t = m_{r0} + 25 \text{ kg} + (MC - m_{r0} - 25 \text{ kg}) \times 0.28$$

(factor 0.28 in the above equation shall be replaced by factor 0.15 in the case of M category vehicles),

where:

v_{\max} is the maximum vehicle speed as specified in paragraph 2. (i) of this annex. **Only the v_{\max} value resulting from the intersection of the required road load power curve and the available power curve of the relevant gear shall be used for the conditions in (3) and (4) above. A v_{\max} value resulting from a limitation of the engine speed which prevents this intersection of curves shall not be used;**

..."

Annex 2, paragraph 3.3., amend to read:

"3.3.

- ...
 (a) All gears $i < n_{g_{vmax}}$ where $n_{min_drive} \leq n_{i,j} \leq n_{max1}^{n_{max_95}}$;
 (b) All gears $i \geq n_{g_{vmax}}$ where $n_{min_drive} \leq n_{i,j} \leq n_{max2}^{n_{max}(n_{g_{vmax}})}$;

..."

Annex 2, paragraph 3.5., amend to read:

"3.5.

...
~~If in (b) $P_{available,i,j} \geq P_{required,j}$ can only be fulfilled in gear $n_g - 1$ when paragraph 3.3.(a) of this annex cannot be fulfilled because the corresponding engine speed exceeds n_{max_95} , this shall be accepted as long as the engine speed does not exceed n_{rated} .~~

~~If in (b) $P_{available,i,j} \geq P_{required,j}$ can only be fulfilled in a gear in which n_{rated} is exceeded, the next higher gear shall be used.~~

..."

Annex 2, paragraph 4.(a), amend to read:

- "(a) **If a one-step higher gear (n+1) is required for only 1 second and the gears before and after are the same (n), gear n+1 shall be corrected to gear n.**

If a **one-step** lower gear is required at a higher vehicle speed during an acceleration phase **for more than 1 second**, the higher gears before shall be corrected to the lower gear. **This correction shall not be performed for gear 1.**

Example: $v_j < v_{j+1} < v_{j+2} < v_{j+3} < v_{j+4} < v_{j+5} < v_{j+6}$. The original calculated gear use is 2, 3, 3, 3, 2, 2, 3. In this case the gear use shall be corrected to 2, 2, 2, 2, 2, 2, 3.

If a one-step lower gear (n-1) is required for only 1 second during an acceleration phase and the gears before and after are the same (n) or higher, gear n-1 shall be corrected to gear n.

Example: $v_{j-1} < v_j < v_{j+1}$. The original calculated gear use is 5, 4, 5 or 5, 4, 6. In this case the gear use shall be corrected to 5, 5, 5 or 5, 5, 6.

If a two-step lower gear is required at a higher vehicle speed during an acceleration phase for just 1 second, this gear and the higher gears before shall be corrected to a one step lower gear. This correction shall not be performed for gear 1."

Annex 2, insert a new paragraph 4.(g), to read:

- "(g) **No upshift to a higher gear at the transition from an acceleration or constant speed phase to a deceleration phase shall be performed if the gear in the phase following the deceleration phase is lower than the upshifted gear.**

Example: If $v_i \leq v_{i+1}$ and $v_{i+2} < v_{i+1}$ and gear $i = 4$ and gear $i+1 = 5$ and gear $i+2 = 5$, then gear $i+1$ and gear $i+2$ shall be set to 4 if the

gear for the phase following the deceleration phase is gear 4 or lower. For all following cycle trace points with gear = 5 within the deceleration phase the gear shall also be set to 4. If the gear following the deceleration phase is gear 5, the upshift shall be performed.

If there is an upshift during the transition and the initial deceleration phase by 2 gears, an upshift by 1 gear shall be performed."

Annex 4, paragraph 4.3.2.1.3., amend to read:

"4.3.2.1.3. Before the coastdown, the anemometer shall be calibrated for speed and yaw offset as specified in ISO 10521-1:2006(E) Annex A-."

Annex 4, paragraph 8.1.3.3., amend to read:

"8.1.3.3. The simulated road load on the chassis dynamometer shall be calculated according to the method as specified in paragraph 4.3.1.4. of this annex, with the exception of measuring in opposite directions, ~~and with applicable corrections according to paragraph 4.5. of this annex, resulting in a simulated road load curve:~~

..."

Annex 5, paragraphs 6.1.2.1. and 6.1.2.2., amend to read:

6.1.2.1. Nitrogen:

Purity: ≤ 1 ppm ~~C₁C₄~~, ≤ 1 ppm CO, ≤ 400 ppm CO₂, ≤ 0.1 ppm NO, < 0.1 ppm NO₂, < 0.1 ppm N₂O, < 0.1 ppm NH₃;

6.1.2.2. Synthetic air:

Purity: ≤ 1 ppm ~~C₁C₄~~, ≤ 1 ppm CO, ≤ 400 ppm CO₂, ≤ 0.1 ppm NO; oxygen content between 18 and 21 per cent volume;"

Annex 5, paragraph 6.1.2.4., amend to read:

"6.1.2.4. Hydrogen (and mixture containing helium or nitrogen):

Purity: ≤ 1 ppm ~~C₁C₄~~, ≤ 400 ppm CO₂; hydrogen content between 39 and 41 per cent volume;"

Annex 6, paragraph 2.3.1., amend to read:

"2.3.1. ...

If at the request of the manufacturer the interpolation method is used (see paragraph 3.2.3.2. of Annex 7), an additional measurement of emissions shall be performed with the road load as determined with test vehicle L. Tests on vehicles H and L should be performed with the same test vehicle and shall be tested with the shortest **n/v ratio (with a tolerance of ± 1.5 per cent) final transmission ratio** within the interpolation family. In the case of a road load matrix family, an additional measurement of emissions shall be performed with the road load as calculated for vehicle L_M according to paragraph 5.1. of Annex 4.

..."

Annex 6, paragraphs 2.6.5.3. to 2.6.6., to be deleted:

~~"2.6.5.3. All transmissions~~

- ~~2.6.5.3.1. — Vehicles equipped with a predominant mode shall be tested in that mode.~~
- ~~2.6.5.3.2. — The manufacturer shall give evidence to the responsible authority of the existence of a mode that fulfils the requirements of paragraph 3.5.9. of this UN GTR. With the agreement of the responsible authority, the predominant mode may be used as the only mode for the determination of criteria emissions, CO₂ emissions, and fuel consumption.~~
- ~~2.6.5.3.3. — If the vehicle has no predominant mode or the requested predominant mode is not agreed by the responsible authority as a predominant mode, the vehicle shall be tested in the best case mode and worst case mode for criteria emissions, CO₂ emissions, and fuel consumption. Best and worst case modes shall be identified by the evidence provided on the CO₂ emissions and fuel consumption in all modes. CO₂ emissions and fuel consumption shall be the arithmetic average of the test results in both modes. Test results for both modes shall be recorded.~~
- ~~2.6.5.3.4. — On the basis of technical evidence provided by the manufacturer and with the agreement of the responsible authority, the dedicated driver selectable modes for very special limited purposes shall not be considered (e.g. maintenance mode, crawler mode). All remaining modes used for forward driving shall be considered and the criteria limits shall be fulfilled in all these modes.~~
- ~~2.6.6. — Unexpected engine stop~~
- ~~If the engine stops unexpectedly, the preconditioning or Type 1 test shall be declared void."~~

Annex 6, insert new paragraphs 2.6.6. to 2.6.6.5., to read:

- "2.6.6. Driver-selectable modes**
- 2.6.6.1. Vehicles equipped with a predominant mode shall be tested in that mode. At the request of the manufacturer, the vehicle may also be tested with the driver-selectable mode in the worst-case position for CO₂ emissions.**
- 2.6.6.2. The manufacturer shall provide evidence to the responsible authority of the existence of a mode that fulfils the requirements of paragraph 3.5.9. of this UN GTR. With the agreement of the responsible authority, the predominant mode may be used as the only mode for the determination of criteria emissions, CO₂ emissions, and fuel consumption.**
- 2.6.6.3. If the vehicle has no predominant mode or the requested predominant mode is not agreed by the responsible authority as being a predominant mode, the vehicle shall be tested in the best case mode and worst case mode for criteria emissions, CO₂ emissions, and fuel consumption. Best and worst case modes shall be identified by the evidence provided on the CO₂ emissions and fuel consumption in all modes. CO₂ emissions and fuel consumption shall be the arithmetic average of the test results in both modes. Test results for both modes shall be recorded. At the request of the manufacturer, the vehicle may also be tested with the driver-selectable mode in the worst case position for CO₂ emissions.**
- 2.6.6.4. On the basis of technical evidence provided by the manufacturer and with the agreement of the responsible authority, the dedicated driver-selectable modes for very special limited purposes shall not be considered (e.g. maintenance mode, crawler mode). All remaining modes used for forward driving shall be considered and the criteria emissions limits shall be fulfilled in all these modes.**

2.6.6.5. Paragraphs 2.6.6.1. to 2.6.6.4. inclusive of this annex shall apply to all vehicle systems with driver-selectable modes, including those not solely specific to the transmission."

Annex 6, paragraph 2.6.7., amend to read:

"2.6.7. **Voiding of the Type 1 test and** ~~Completion of the cycle~~

If the engine stops unexpectedly, the preconditioning or Type 1 test shall be declared void.

After completion of the cycle, the engine shall be switched off. The vehicle shall not be restarted until the beginning of the test for which the vehicle has been preconditioned."

Annex 6, Appendix 2, paragraph 2.1.1., amend to read:

"2.1.1. The REESS current(s) shall be measured during the tests using a clamp-on or closed type current transducer. The current measurement system shall fulfil the requirements specified in Table A8/1. The current transducer(s) shall be capable of handling the peak currents at engine starts and temperature conditions at the point of measurement.

In order to have an accurate measurement, zero adjustment and degaussing shall be performed before the test according to the instrument manufacturer's instructions."

Annex 6, Appendix 2, paragraph 4.1., amend to read:

"4.1. ...

U_{REESS} is the nominal REESS voltage determined according to ~~DIN~~ **EN IEC 60050-482**, V;

..."

Annex 7, paragraph 3.2.1.1.3.2., amend to read:

"3.2.1.1.3.2. ...

If ~~$r_f R_f$~~ $r_f R_f < 1.05$, it may be omitted in the equations for case (b) above for C_{CH4} and C_{NMHC} ."

Annex 7, paragraph 8., amend to read:

"8. ...

r_i is the transmission ratio in gear ~~i~~ **i** ;

...

H/W is the tyre's aspect ratio, e.g. "45" for a 225/45 R17 tyre;

W is the tyre width, mm; e.g. "225" for a 225/45 R17 tyre;

R is the wheel diameter, inch; e.g. "17" for a 225/45 R17 tyre.

U_{dyn} shall be rounded to whole ~~millimeters~~ millimetres.

If U_{dyn} is different for the front and the rear axles, the value of n/v for the mainly powered axle shall be applied. Upon request, the responsible authority shall be provided with the necessary information for that selection."

Annex 8, Appendix 3, paragraph 2.1.1., amend to read:

"2.1.1. The REESS current(s) shall be measured during the tests using a clamp-on or closed type current transducer. The current measurement system shall fulfil the requirements specified in Table A8/1 of this annex. The current transducer(s) shall be capable of handling the peak currents at engine starts and temperature conditions at the point of measurement.

In order to have an accurate measurement, zero adjustment and degaussing shall be performed before the test according to the instrument manufacturer's instructions."

Annex 8, Appendix 3, paragraph 3.2., amend to read:

"3.2. Nominal REESS voltage

For NOVC-HEVs, NOVC-FCHVs and OVC-HEVs, instead of using the measured REESS voltage according to paragraph 3.1. of this appendix, the nominal voltage of the REESS determined according to ~~DIN EN~~ IEC 60050-482 may be used."

Annex 8, Appendix 6, paragraph 1.1., amend to read:

"1.1. The manufacturer shall select the driver-selectable mode for the Type 1 test procedure according to paragraphs 2. to ~~paragraph 4.~~ inclusive of this appendix which enables the vehicle to follow the considered test cycle within the speed trace tolerances according to paragraph 2.6.8.3. of Annex 6. **This shall apply to all vehicle systems with driver-selectable modes including those not solely specific to the transmission.**"

Annex V

Technical report on the development of Amendment 3 to GTR No. 15 on WLTP

Adopted on the basis of GRPE-75-07 (see para. 11)

I. Mandate

1. Amendment 3 to UN global technical regulation (GTR) No. 15 was developed by the Informal Working Group (IWG) on Worldwide harmonized Light vehicles Test Procedures (WLTP) in the framework of Phase 2 of the development of GTR No. 15. The Executive Committee of the 1998 Agreement (AC.3) adopted the authorization to develop Phase 2 of GTR No. 15 at its June 2016 session (ECE/TRANS/WP.29/AC.3/44).

II. Objectives

2. To clarify phase, cycle and vehicle class terminology. This enabled permitting interpolation between different levels of downscaling, cycle classes and speed caps, all of which had been agreed as technically justifiable. All figures in the GTR showing WLTC cycle phases and the corresponding time/speed tables were modified accordingly.

3. To introduce improvements to the gear shifting procedures. This was achieved by including changes to gear selection and shift point determination for vehicles equipped with manual transmissions. In detail, this involved calculating gearshift points within an interpolation family, defining the v_{\max} to be used for classification and gear use determination, clarification of the use of v_{\max} using the downscaled cycle as a base cycle, calculating the minimum engine speed to drive, clarifying the conditions the gear in which maximum speed is reached, and providing an additional safety margin for the full load power curve.

4. To define the possible and permissible combinations of test vehicle selection and family requirements. This was done by introducing a table and eliminating the repetition of text.

5. To define the calculation of the average test mass during road load determination.

6. To define single and double roller dynamometers.

7. To correct minor spelling mistakes and/or punctuation, and restructuring some paragraphs. To bring writing and formatting consistency to the GTR.

III. Meetings held by Task Forces

8. The proposed changes in Amendment 3 to GTR No. 15 listed in section II above were discussed at length and agreed upon by all participants during the following Task Force face-to-face or audio/web meetings:

- (a) Drafting Sub-group on 2 March 2017;
- (b) The seventeenth IWG meeting in January 2017 in Geneva;
- (c) Gearshift Task Force meetings held on 26 September and 16 December 2016.

Annex VI

Amendments to Regulation No. 49 (Emissions of compression ignition and positive ignition (LPG and CNG) engines)

Adopted on the basis of GRPE-74-08 (see para. 22)

A new Supplement to the 05 series of amendments to Regulation No. 49

Annex 4B, paragraph 7.8.4., amend to read:

"7.8.4. Drift verification

As soon as practical but no later than 30 minutes after the test cycle is complete or during the soak period (**for (b) only**), the zero and span responses of the gaseous analyser ranges used shall be determined. For the purpose of this paragraph, test cycle is defined as follows:

- (a) For the WHTC: the complete sequence cold – soak – hot;
- (b) For the WHTC hot start test (paragraph 6.6.): the sequence soak – hot;
- (c) For the multiple regeneration WHTC hot start test (paragraph 6.6.): the total number of hot start tests;
- (d) For the WHSC: the test cycle.

The following provisions apply for analyzer drift:

- (a) The pre-test zero and span and post-test zero and span responses may be directly inserted into equation 66 of paragraph 8.6.1. without determining the drift;
- (b) If the drift between the pre-test and post-test results is less than 1 per cent of full scale, the measured concentrations may be used uncorrected or may be corrected for drift according to paragraph 8.6.1. of this annex;
- (c) If the drift difference between the pre-test and post-test results is equal to or greater than 1 per cent of full scale, the test shall be voided or the measured concentrations shall be corrected for drift according to paragraph 8.6.1. of this annex."

Annex 4B, paragraph 8.4.1.7., amend to read:

"8.4.1.7. Carbon balance method

This involves exhaust mass calculation from the fuel flow and the gaseous exhaust components that include carbon. The calculation of the instantaneous exhaust gas mass flow is as follows:

$$q_{mew,i} = q_{mf,i} \times \left(\frac{w_{BET}^2 \times 1.4}{(1.0828 \times w_{BET} + k_{fd} \times k_c)} \times k_c \left(1 + \frac{H_a}{1000} \right) + 1 \right) \quad (33)$$

With

$$k_c = (c_{CO2d} - c_{CO2d,a}) \times 0.5441 + \frac{c_{COd}}{18.522} + \frac{c_{HCw}}{17.355} \quad (34)$$

And

$$k_{fd} = -0.055594 \times w_{ALF} + 0.0080021 \times w_{DEL} + 0.0070046 \times w_{EPS} \quad (35)$$

$$k_c = (c_{CO2d} - c_{CO2d,a}) \times 0.5441 + c_{COd}/18522 + c_{HCw}/17355 \quad (34)$$

$$k_{fd} = -0.055586 \times w_{ALF} + 0.0080021 \times w_{DEL} + 0.0070046 \times w_{EPS} \quad (35)$$

Where:

$q_{mf,i}$ is the instantaneous fuel mass flow rate, kg/s

H_a is the intake air humidity, g water per kg dry air

w_{BET} is the carbon content of the fuel, per cent mass

w_{ALF} is the hydrogen content of the fuel, per cent mass

w_{DEL} is the nitrogen content of the fuel, per cent mass

w_{EPS} is the oxygen content of the fuel, per cent mass

c_{CO2d} is the dry CO₂ concentration, per cent

$c_{CO2d,a}$ is the dry CO₂ concentration of the intake air, per cent

c_{COd} is the dry CO concentration, ppm

c_{HCw} is the wet HC concentration, ppm"

Annex 4B, paragraph 9.3.9.4.1., amend to read:

"9.3.9.4.1. Sample dryer efficiency

For dry CLD analyzers, it shall be demonstrated that for the highest expected water vapour concentration H_m (see paragraph 9.3.9.2.2.), the sample dryer maintains CLD humidity at ≤ 5 g water/kg dry air (or about ~~0.008~~ **0.8 volume** per cent H₂O), which is 100 per cent relative humidity at 3.9 °C and 101.3 kPa. This humidity specification is also equivalent to about 25 per cent relative humidity at 25 °C and 101.3 kPa. This may be demonstrated by measuring the temperature at the outlet of a thermal dehumidifier, or by measuring humidity at a point just upstream of the CLD. Humidity of the CLD exhaust might also be measured as long as the only flow into the CLD is the flow from the dehumidifier."

Annex 4B, paragraph 9.4.2., amend to read:

"9.4.2. General requirements of the dilution system

The determination of the particulates requires dilution of the sample with filtered ambient air, synthetic air or nitrogen (the diluent). The dilution system shall be set as follows:

- (a) Completely eliminate water condensation in the dilution and sampling systems;

- (b) Maintain the temperature of the diluted exhaust gas between 315 K (42 °C) and 325 K (52 °C) within 20 cm upstream or downstream of the filter holder(s);
- (c) The diluent temperature shall be between 293 K and 325 K (20 °C to ~~42~~ 52 °C) in close proximity to the entrance into the dilution tunnel;
- (d) The minimum dilution ratio shall be within the range of 5:1 to 7:1 and at least 2:1 for the primary dilution stage based on the maximum engine exhaust flow rate;
- (e) For a partial flow dilution system, the residence time in the system from the point of diluent introduction to the filter holder(s) shall be between 0.5 and 5 seconds;
- (f) For a full flow dilution system, the overall residence time in the system from the point of diluent introduction to the filter holder(s) shall be between 1 and 5 seconds, and the residence time in the secondary dilution system, if used, from the point of secondary diluent introduction to the filter holder(s) shall be at least 0.5 seconds.

Dehumidifying the diluent before entering the dilution system is permitted, and especially useful if diluent humidity is high."

Annex 4B, paragraph 9.5.5., amend to read:

"9.5.5. Total system verification

The total accuracy of the CVS sampling system and analytical system shall be determined by introducing a known mass of a pollutant gas into the system while it is being operated in the normal manner. The pollutant is analyzed, and the mass calculated according to paragraph 8.5.2.3. except in the case of propane where a *u* factor of ~~0.000472~~ **0.000507** is used in place of ~~0.000480~~ **0.000483** for HC. Either of the following two techniques shall be used."

Annex 4B, Appendix 4, paragraph A.4.2., amend to read:

"A.4.2. Regression analysis

The slope of the regression shall be calculated as follows:

$$a_1 = \frac{\sum_{i=1}^n (y_i - \bar{y}) \times (x_i - \bar{x})}{\sum_{i=1}^n (x_i - \bar{x})^2} \quad (94)$$

The y intercept of the regression shall be calculated as follows:

$$a_0 = \bar{y} - (a_1 \times \bar{x}) \quad (95)$$

The standard error of estimate (SEE) shall be calculated as follows:

$$SEE = \frac{\sqrt{\sum_{i=1}^n [y_i - a_0 - (a_1 \times x_i)]^2}}{n - 2} \quad (96)$$

$$SEE = \sqrt{\frac{\sum_{i=1}^n [y_i - a_0 - (a_1 \times x_i)]^2}{n-2}} \quad (96)$$

The coefficient of determination shall be calculated as follows:

$$r^2 = 1 - \frac{\sum_{i=1}^n [y_i - a_0 - (a_1 \times x_i)]^2}{\sum_{i=1}^n (y_i - \bar{y})^2} \quad (97)''$$
