



# Economic and Social Council

Distr.: General  
12 July 2019

Original: English

## Economic Commission for Europe

### Inland Transport Committee

### World Forum for Harmonization of Vehicle Regulations

### Working Party on Pollution and Energy

#### Seventy-ninth session

Geneva, 21-24 May 2019

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

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## I. Attendance

1. The Working Party on Pollution and Energy (GRPE) held its seventy-ninth session from 21 to 24 May 2019, 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, Norway, Poland, Republic of Korea, Russian Federation, Spain, Sweden, Switzerland and United Kingdom of Great Britain and Northern Ireland. Experts from the European Commission (EC) also participated. Experts from the following non-governmental organizations (NGOs) took part in the session: Association for Emissions Control by Catalyst (AECC), International Motor Vehicle Inspection Committee (CITA), European Association of Automobile Suppliers (CLEPA/MEMA/JAPIA), European Garage Equipment Association (EGEA), European Association of Internal Combustion Engine Manufacturers (EUROMOT), International Motorcycle Manufacturers Association (IMMA), International Organization of Motor Vehicle Manufacturers (OICA) and Liquid Gas Europe.

## II. Adoption of the agenda (agenda item 1)

*Documentation:* ECE/TRANS/WP.29/GRPE/2019/9  
Informal documents GRPE-79-01, GRPE-79-02-Rev.1 and  
GRPE-79-09-Rev.3

2. Mr. Rijnders, Chair of GRPE, opened the meeting and welcomed the participants. GRPE adopted the provisional agenda of the seventy-ninth session (ECE/TRANS/WP.29/GRPE/2019/9), as updated and consolidated in GRPE-79-09-Rev.3. GRPE took note of GRPE-79-01 on the organization of GRPE Informal Working Group (IWG) meetings held during the week.

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

4. The secretariat introduced GRPE-79-02-Rev.1, announcing that the next GRPE session would take place on from 14 to 17 January 2020 and recalling the corresponding deadline (21 October 2019) for the submission of official documents. The Chairs and Secretaries of IWGs were invited to approach the secretariat to define the calendar of IWGs meetings for the January 2020 GRPE session. The secretariat also announced the potential shortage of meeting space capacity from October 2019 in the Palais des Nations.

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

*Documentation:* ECE/TRANS/WP.29/1145  
Informal documents GRPE-79-03 and GRPE-79-04-Rev.2

5. The secretariat introduced GRPE-79-03 and reported on relevant items discussed during the 177th session of the World Forum for Harmonization of Vehicle Regulations (WP.29). He referred to ECE/TRANS/WP.29/1145 for further details.
6. The Chair presented GRPE-79-04-Rev.2 detailing priority topics for GRPE activities, as prepared by the Chair and the secretariat. The Chair highlighted the need to develop this GRPE priorities document to fulfil the political demand as stipulated in the Inland Transport Committee (ITC) Strategy adopted during the last ITC session in February 2019. WP.29 also expressed their wish to identify work priorities in the GRs to potentially allocate adequate resources to fulfil the objectives set by each GR. He also underlined that the priorities should be aligned with the SDGs, developed under the 2030 Agenda.
7. GRPE supported the proposal and found this approach highly relevant in the rapidly evolving context and digitalization of vehicles. Some Contracting Parties (CPs) wanted more clarity on the potential future topics under the UN vehicle agreements (1958, 1997 or 1998 Agreement) will be developed under. The secretariat highlighted this document is aimed at being a bottom-up from GRPE stakeholders that would then be discussed and coordinated during AC.2 sessions of WP.29.
8. GRPE agreed to support the Chair to request IWG on Periodic Technical Inspection (PTI) (WP.29) to come and present on on-going and longer-term activities at forthcoming sessions of GRPE, to foster closer collaboration on lifetime compliance.
9. GRPE agreed to rename agenda item 13 into "Priority topics for GRPE activities" where this issue will be covered regularly in future GRPE sessions (see para. 66).
10. GRPE edited GRPE-79-04-Rev.2 during the session and based on comments received from CPs not attending. GRPE agreed to submit the amended document to the next session of GRPE in January 2020 as an informal document (GRPE-80-04). The Chair proposed to present this document during the March 2020 session of WP.29 once GRPE had agreed on the content of the document.

### **IV. Light vehicles (agenda item 3)**

#### **A. UN Regulations Nos. 68 (Measurement of the maximum speed, including electric vehicles), 83 (Emissions of M<sub>1</sub> and N<sub>1</sub> vehicles), 101 (CO<sub>2</sub> emissions/fuel consumption) and 103 (Replacement pollution control devices)**

*Documentation:* Informal documents GRPE-79-05, GRPE-79-06, GRPE-79-10, GRPE-79-11, GRPE-79-15, GRPE-79-16 and GRPE-79-17

11. The representative from CITA introduced GRPE-79-06 on the highlights of the CITA annual congress held in Republic of Korea in April 2019. He summarized the latest updates on emissions measurements during PTI tests. The Chair highlighted the importance of the topic and recalled it has been included in the draft priority list of GRPE (see para. 6).
12. The representative from Spain referred to the measurement of particulate number (PN) and asked whether a mature technology to measure PN during PTI tests was available on the market. The representative from CITA explained that the technology was mature and that some countries were about to implement PN measurements during PTI tests in the coming years, in the 2020/2021 time horizon. The representative from Netherlands confirmed PN tests are expected in 2021. He also highlighted the importance of in-use emission monitoring in the

rapid technology changes the vehicle industry is facing, with digitalization, over-the-air updates and self-learning features that need to be considered.

13. The representative from CITA introduced GRPE-79-05 proposing amendments to the 06 and 07 series of amendments to UN Regulation No. 83. The representative from EC wondered if the proposed new paragraph 5.1.9. would not be more appropriate in UN Regulation No. 49 where there is evidence of Selective Catalytic Reduction (SCR) tampering of heavy-duty vehicle was better documented. The representative from CITA reckoned the issue with SCR tampering in heavy-duty applications was existing and documented and clarified the intention to amend UN Regulation No. 83 was to anticipate expected future issues for light-duty vehicles.

14. The representative from OICA stated the proposed amendment implied physical changes to existing vehicles for infrequent road worthiness tests. He added that such proposal does not make tampering more difficult. He said a better way would be to address the offer of tampering devices, for example following the initiative from Austria legally prohibiting the sale and advertisement of tampering devices. He did not support the proposal and encouraged closer collaboration with CITA to improve the situation of road-side and inspection tests. The representative from CITA agreed the proposal needed to be strengthened, and this proposal was a first step. He said that authorities performing road worthiness tests needed to be able to measure emissions to characterize tampering, which was not often the case today, partly because of lack of access to software and sensors signals of the vehicles.

15. The Chair highlighted undertaking the issue of tampering was an ample strategy needing diverse approaches to it, through vehicle design, PTI, roadside inspection, market availability, etc. and invited CITA to table a working document for the next session of GRPE in January 2020, in close collaboration with EC, OICA and other interested stakeholders.

16. The expert from OICA introduced GRPE-79-10 requiring clarification on the consolidation of ECE/TRANS/WP.29/GRPE/2017/2 into UN Regulation No. 83. The representative from EC suggested that the issue identified could originate from how the document was drafted. The Chair accepted the request for clarification was valid and acknowledged the request for guidance from GRPE on consolidation interpretation when needed. The representative from the Russian Federation, as submitter of ECE/TRANS/WP.29/GRPE/2017/2, confirmed that the new text is an addition to the existing paragraph, not a substitution. The Chair confirmed that paragraph 1.1. consolidated with Supplement 10 and 5 to the 06 and 07 series of amendments to UN Regulation No. 83 should read:

“1.1. This Regulation shall apply to vehicles of categories M1, M2, N1 and N2 with a reference mass not exceeding 2,610 kg.

At the manufacturer's request, type approval granted under this Regulation may be extended from vehicles mentioned above to M1, M2, N1 and N2 vehicles with a reference mass not exceeding 2,840 kg and which meet the conditions laid down in this Regulation.

At the manufacturer's request, type approval granted under this Regulation may be extended from vehicles mentioned above to special purpose vehicles of categories M1, M2, N1 and N2 regardless of their reference mass. The manufacturer shall demonstrate to the Type Approval Authority which granted the type approval that the vehicle in question is a special purpose vehicle.”

17. The expert from OICA updated GRPE on the status of the work related to propose an amendment to UN Regulation No. 101 (GRPE-79-11) to accept the tests currently performed in the European Union in the interest of correlation between NEDC and WLTP outside of the European Union where such correlation does not exist. The representative of Australia described the measure taken in the country to accept approvals based on WLTP and still rely on NEDC-based values for fiscal and labelling purposes.

18. The expert from OICA introduced GRPE-79-15, GRPE-79-16 and GRPE-79-17 proposing modifications to the 07 series of amendments to UN Regulation No. 83 on On-Board Diagnosis (OBD). The representative from Netherlands, France and EC required more time to analyse the proposals and to consult internally with the appropriate experts on OBD.

The representative from EC requested a more thorough assessment and more detailed specifications of the needs and requirements to amend the regulatory text. The Chair acknowledged that the specific expertise on OBD from CPs was in most cases not present in the room and proposed OICA to further develop the proposals and submit as working documents for the next session of GRPE in January 2020.

## **B. UN 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 Procedures (WLTP EVAP))**

*Documentation:* ECE/TRANS/WP.29/2019/66, ECE/TRANS/WP.29/2019/67,  
ECE/TRANS/WP.29/2019/68, ECE/TRANS/WP.29/2019/69,  
ECE/TRANS/WP.29/2019/70  
Informal documents GRPE-79-08-Rev.1, GRPE-79-19

19. The Chair of IWG on WLTP introduced GRPE-79-08-Rev.1 updating GRPE on the latest activities of IWG on WLTP. He requested an extension until June 2020 for the activities of the group, as he recalled GRPE the current Terms of Reference (ToRs) of IWG on WLTP had an expiration date in December 2019. The representative from Canada asked about the plans of IWG on WLTP after Jun 2020. The Chair of IWG on WLTP stated the future will depend on the content of the work which remained to be defined at the time. The Chair of GRPE highlighted it would be important to hold the discussions with all other IWGs. GRPE noted the request for a meeting room for one and a half day during the GRPE week in January 2020.

20. The representative from EC indicated that the work item on road loads covered in the status report was discussed and some CPs requested it, but the item was finally not prioritized. She agreed with the extension of the ToRs for IWG on WLTP for six months and requested that longer-term work items should be considered in conjunction with the broader work priorities for GRPE (as introduced in paras. 6 to 10). The representative of Switzerland was also in agreement with the six-month prolongation and to further align with the GRPE priorities.

21. GRPE agreed to prolong the work of IWG on WLTP until June 2020, as reflected in Annex III.

22. The representative from EC introduced GRPE-79-19 on the latest activities of the Transposition Task Force aimed at drafting a UN Regulation from UN GTRs Nos. 15 and 19. The representative from OICA requested about the possibility to include specific provisions for CPs only needing national application for a national context to not have to wait for the most stringent Level 1 subject to mutual recognition to enter into force to fully benefit from the latest evolution of the legal text. Currently an additional six-month period is envisaged so that the regional levels are not subject to mutual recognition. The representative from OICA also appealed to certification or Type Approval Authorities whether the proposed approach to identify the stringency level by its series of amendment number was enough to identify the harmonization level or that an indication of the level of harmonization would also be needed in the approval number.

23. The secretariat introduced ECE/TRANS/WP.29/2019/66, ECE/TRANS/WP.29/2019/67, ECE/TRANS/WP.29/2019/68, ECE/TRANS/WP.29/2019/69 and ECE/TRANS/WP.29/2019/70 correcting the French translations of specific terms that were mistranslated in UN GTR No. 15 and its Amendment 1 to 4. GRPE endorsed the proposed new French translations that will be considered for voting during the next session of WP.29/AC.3 in June 2019.

## **C. Worldwide harmonized Real Driving Emissions (RDE) test procedure**

*Documentation:* ECE/TRANS/WP.29/2019/72  
Informal documents GRPE-79-20-Rev.1

24. The representative from EC introduced GRPE-79-20-Rev.1 detailing the latest activities from IWG on RDE. She added that, in parallel with the development of the UN GTR on RDE, a new UN Regulation on RDE would be developed, based on European Union legislation. GRPE agreed to the development of a new UN Regulation on RDE. The representative from European Union confirmed that both UN GTR and UN Regulation will be closely looked after to avoid any discrepancies between the two texts.

25. GRPE noted the request for a meeting room for a day during the GRPE week in January 2020.

## **V. Heavy duty vehicles (agenda item 4)**

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

26. The representative from EC informed GRPE on the latest legislative amendments in the European Union, with the forthcoming introduction of Step E of the Euro VI legislation. She added this would potentially lead to an amendment of UN Regulation No. 49 in the coming sessions of GRPE.

### **B. UN 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 had not received any new proposals for discussion under this agenda item.

### **C. Worldwide provisions for Heavy Duty vehicles Fuel Economy**

*Documentation:* Informal document GRPE-79-12

28. The expert from OICA introduced GRPE-79-12 detailing the next steps to initiate work on the harmonization of fuel economy procedures for heavy duty vehicles. He emphasized that the workshop in January 2020 during the week of the next session of GRPE will be held for information sharing and to identify potential parties that would be interested to work on the topic.

29. GRPE noted the request for a meeting room for a half a day during the GRPE week in January 2020.

## **VI. UN Regulations Nos. 24 (Visible pollutants, measurement of power of C.I. engines (Diesel smoke)), 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:* ECE/TRANS/WP.29/GRPE/2019/10,  
ECE/TRANS/WP.29/GRPE/2019/11  
Informal document GRPE-79-27-Rev.1

30. The expert from Italy presented ECE/TRANS/WP.29/GRPE/2019/10 which established the conditions to consider direct and indirect injection vehicles as being part of the same approval family. The representative from Netherlands requested some clarifications to the text to make sure the Particulate Number (PN) limit was valid. The representative from Italy declared the proposal has no impact on gasoline operations and a proposed slight

amendment to the text, as reproduced in Annex IV. The representatives from Netherlands, France and EC agreed the proposed new text clarified the proposal.

31. The representative from Liquid Gas Europe agreed with the proposed improvement and supported the proposal.

32. GRPE endorsed the proposal and requested the secretariat to submit Annex IV to WP.29 and AC.1 for consideration and vote at their November 2019 sessions as draft Supplement 9 to UN Regulation No. 115.

33. The expert from OICA introduced ECE/TRANS/WP.29/GRPE/2019/11 and GRPE-79-27-Rev.1 that amended the footnote 9 in table 1 of Annex 5 to introduce an alternative for the measurement of power of charge-air-cooled engines. The representative from United Kingdom of Great Britain and Northern Ireland required clarifications on considerations about the test temperature and potential concerns about tests being done at extreme temperatures. Amendments were provided in GRPE-79-27-Rev.1. GRPE supported the new proposal in GRPE-79-27-Rev.1 as reproduced in Annex V.

34. GRPE endorsed the proposal and requested the secretariat to submit Annex V of the report to WP.29 and the AC.1 for consideration and vote at their November 2019 sessions as draft Supplement 10 to UN Regulation No. 85.

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

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

35. GRPE had not received any new proposals for discussion under this agenda item.

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

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

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

*Documentation:* Informal document GRPE-79-07, GRPE-79-13 and GRPE-79-14

37. The representative from the Russian Federation introduced GRPE-79-07 raising awareness of non-exhaust particulate emissions from brake, tyre and road abrasion. The Chair highlighted the topic was in the agenda of IWG on PMP, highlighting the relevance of the topic. He also mentioned GRBP was considering a proposal from Netherlands on road surface labelling that included traffic noise reduction, wet skid resistance, rolling resistance and lifespan (ECE/TRANS/WP.29/GRB/2019/2).

38. The Chair of IWG on Particle Measurement Programme (PMP) presented a status report on activities on exhaust and non-exhaust particle emissions (GRPE-79-13).

39. The representative from India enquired about any correlation between existing evaporation tubes and strippers for sub-23 nm particulate emission measurements. The Chair of IWG on PMP answered evaporation was working for diesel engines, and that for spark ignition engines (e.g. 2-stroke L-category vehicles), some artefacts were measured. IWG on PMP was considering adoption of two approaches for the future. The representative from India asked further explanations about the dispersion found in the round robin tests. The Chair of IWG on PMP explained two Condensation Particle Counters (CPCs) were connected to the same exhaust line, one to measure 23nm particulates, one to measure 10nm particulates. He highlighted the location of the sampling points are of high importance and could explain part of the dispersion found. He emphasized that the hot start variability was higher as absolute values were lower than for cold starts. The representative from India finally asked whether



the dispersion was fit for post Euro 6 measurements. The Chair of IWG on PMP answered that only one CPC would be prescribed in the future legislation, ensuring more consistent measurement and easier location of the sampling point in the exhaust line.

40. The Chair requested about the expected timeline to deliver on a procedure for sub-23 nm particulate measurement. The Chair of IWG on PMP confirmed they are expecting a working document for the GRPE session of June 2020.

41. The representative of the United States of America confirmed the findings on non-exhaust particulate in the US were consistent with IWG on PMP and the results shown by the representative of the Russian Federation in GRPE-79-07. He explained that the characteristics of tyres are changing to improve safety and rolling resistance and encouraged GRPE to carefully consider the impact of such tyre modifications on the wear of tyres and associated particulate emissions. He proposed to potentially make a presentation at the next GRPE session in January 2020 about the on-going activities in the United States of America on the matter.

42. The Chair of IWG on PMP introduced the revised ToRs of IWG on PMP (GRPE-79-14) seeking to extend the activities of IWG on PMP until June 2021. The Chair of IWG on WLTP asked whether IWG on WLTP should anticipate some work loads to adapt UN GTR No. 15 to sub-23nm requirements. The Chair of IWG on PMP did not expect in-depth modifications to UN GTR No.15 and would be happy to further work with IWG on WLTP to better coordinate the activities.

43. The representative from OICA requested further considerations on transitional provisions when the new method to measure sub-23nm particulates had been finalized. The Chair agreed such considerations were important and will be undertaken when the new procedure became available and ready to be included into legal texts.

44. The representative from EUROMOT requested clarifications about a potential update to UN Regulation No. 96 as a new series of amendments had just been released. The Chair confirmed UN Regulation No. 96 should also be considered for inclusion of sub-23nm particulate emission measurement. The representative from EUROMOT highlighted that the upcoming sub-23 nm measurement procedure was likely to be implemented for light and heavy-duty vehicles as part of new emission limits package, whereas in the case of Non-Road Mobile Machinery (NRMM), a new package had recently been adopted. The Chair of IWG on PMP confirmed the work on sub-23nm was focusing on on-road applications, and no development work was on-going for NRMM, for which a validation could be performed if needed. The Chair proposed to investigate further to assess the differences between on-road and off-road applications when the procedure would be available.

45. GRPE supported the extension of the mandate of IWG on PMP until June 2021 as reflected in Annex III.

46. GRPE acknowledged the progress made by IWG on PMP and noted the request for a meeting room for a half a day during the GRPE week in January 2020.

## **IX. Motorcycles and mopeds (agenda item 8)**

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

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

### **B. UN 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)**

*Documentation:* ECE/TRANS/WP.29/GRPE/2019/12,  
Informal documents GRPE-79-21-Rev.1, GRPE-79-22 and GRPE-79-23

48. The Chair of IWG on Environmental and Propulsion Performance Requirements for L-category vehicles (EPPR) introduced ECE/TRANS/WP.29/GRPE/2019/12, GRPE-79-21-Rev.1 and GRPE-79-22 as a draft proposal for Amendment 4 to UN GTR No. 2.

49. GRPE adopted ECE/TRANS/WP.29/GRPE/2019/12 as amended by GRPE-79-21-Rev.1 as reflected in Addendum 1 to this report as draft Amendment 4 to UN GTR No. 2. GRPE also adopted the technical report (GRPE-79-22) as reproduced in Annex VI. GRPE requested the secretariat to submit Addendum 1 and Annex VI to WP.29 and AC.3 for consideration and vote at their November 2019 sessions.

50. The Chair of IWG on EPPR presented the latest progress about a new amendment to UN GTR No. 18 and the OBD2 provisions for L-category vehicles (GRPE-79-23).

### **C. Environmental and Propulsion Performance Requirements (EPPR) for L-category vehicles**

*Documentation:* Informal document GRPE-79-24

51. The Chair of IWG on EPPR presented a status report (GRPE-79-24). He updated GRPE on the progress of IWG and introduced the upcoming activities of the group. The representative of the United States of America asked more details about the involvement of the California Air Resources Board (CARB) in the activities of IWG on EPPR. The Chair of IWG on EPPR explained CARB was considering revising their regulatory provisions on two-wheelers and was seeking to streamline resources.

52. The representatives from Netherlands and India asked about the potential inclusion of electric and hybrid L-category vehicles in the future activities. The Chair of IWG on EPPR replied that electric L-category vehicles were momentarily not included because of time constraints and that IWG on EPPR will address them soon.

53. GRPE acknowledged the progress made by IWG on EPPR and noted the request for a meeting room for one day during the GRPE week in January 2020.

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

### **A. UN GTR on the Determination of Electrified Vehicle Power (DEVP)**

*Documentation:* Informal document GRPE-79-29-Rev.1

54. The Chair of IWG on Electric Vehicles and the Environment (EVE) introduced GRPE-79-29-Rev.1 proposing an update to ECE/TRANS/WP.29/AC.3/53 reflecting the new timeline for the development of the new standalone UN GTR on DEVP.

55. The Chair of IWG on WLTP explained a mismatch in delivery expectations between IWG on WLTP and IWG on EVE, as IWG on WLTP needed a timely delivery of the UN GTR on DEVP in order to finalize Phase 2b activities of IWG on WLTP. He showed his gratitude to the new timeline presented and highlighted respecting this new timeline was of high importance.

56. GRPE endorsed GRPE-79-29-Rev.1 and requested the secretariat to submit GRPE-79-29-Rev.1 to WP.29 and AC.3 for consideration and vote at their November 2019 sessions.

### **B. Other activities of IWG on EVE**

*Documentation:* Informal document GRPE-79-28-Rev.1

57. The Chair of IWG on EVE presented the status report introducing the latest activities of the group (GRPE-79-28-Rev.1). He highlighted latest discussions held during the last meeting of IWG on EVE in conjunction with GRPE provided useful guidance to the group. The representative from EC emphasized the work on battery durability was a critical element for further progress of the activities of IWGs on EVE and WLTP. She stated more in-depth discussions with other CPs will be held in the coming weeks to agree on a timeline and deliverable schedules that would satisfy all parties.

58. The expert from OICA acknowledged the proposed new timeline for the development of the in-vehicle battery durability provisions and was satisfied with the use of deterioration factors to characterise in-vehicle battery durability as a first step. The Chair insisted initial feedback would be appreciated on the matter during the next GRPE session in January 2020.

59. GRPE supported the extension of the mandate of IWG on EVE until June 2021 as reflected in Annex III.

60. GRPE acknowledged the progress made by IWG on EVE and noted the request for a meeting room for half a day during the GRPE week in January 2020.

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

61. GRPE had not received any new proposals for discussion under this agenda item.

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

*Documentation:* Informal documents GRPE-79-25 and GRPE-79-26

62. The expert from OICA, ambassador of GRPE at IWVTA, introduced GRPE-79-25 showing the outcome of a study (GRPE-79-26) performed by a type approval authority and technical service from United Kingdom of Great Britain and Northern Ireland on the compliance of UN Regulations with the schedule 4 of the 1958 Agreement, subjected to enter into force by the end of 2019. The study highlighted that GRPE-related UN Regulations had no conflict with schedule 4 of the 1958 Agreement. GRPE acknowledged this outcome and asked the ambassador to report on this issue at forthcoming event of IWVTA.

63. The ambassador of GRPE at IWVTA also reiterated the open questions on the inclusion of GRPE-related UN Regulations into UN Regulation No. 0. He detailed the five remaining issues regarding UN Regulations Nos. 24, 49, 133 and forthcoming UN Regulations on WLTP and RDE. GRPE did not take any decision and recalled what had been discussed during the last session of GRPE in January 2019 (ECE/TRANS/WP.29/GRPE/78, paras. 59-61).

## **XIII. Vehicle Interior Air Quality (VIAQ) (agenda item 12)**

*Documentation:* Informal document GRPE-79-18

64. The Chair of IWG on Vehicle Interior Air Quality (VIAQ) presented a status report on the ongoing activities of the group (GRPE-79-18). He informed GRPE about the latest progress and the items agreed during the last IWG meetings, highlighting that the amendments to Mutual Resolution No. 3 were being developed according to schedule.

65. GRPE acknowledged the progress made by IWG on VIAQ and noted the request for a meeting room for half a day during the GRPE week in January 2020.

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

66. GRPE agreed to rename this agenda item to "Priority topics for GRPE activities" as of the next session of GRPE in January 2020.

## **XV. Election of Officers (agenda item 14)**

67. In compliance with Rule 37 of the Rules of Procedures (TRANS/WP.29/690, as amended) GRPE unanimously elected Mr. A. Rijnders (Netherlands) as Chair of GRPE for the sessions in the year 2020.

## **XVI. Any other business (agenda item 15)**

*Documentation:* ECE/TRANS/WP.29/GRPE/2019/13

68. The representative from OICA introduced ECE/TRANS/WP.29/GRPE/2019/13 proposing amendments to Annex 4 to Mutual Resolution R.E.3. on market fuel quality recommendations. The representative from Netherlands asked if and when can the market fuel quality recommendations be updated for Non-Road Mobile Machinery (NRMM). The representative from OICA stated that EUROMOT supported the initiative and that they might want to update the section about NRMM in the future.

69. The representatives from Netherlands, Spain and EC supported the proposal.

70. The Chair highlighted that fuel quality was of paramount importance to deliver on sustained low emissions from cars, as both cleaner fuels and advanced emission control systems were needed to deliver on cleaner tailpipe emissions. Using the right fuel quality represented an essential prerequisite to a successful and long-lasting improvement of air quality.

71. He suggested that it would be important to include all vehicle categories in this document to provide a more comprehensive guidance to countries on the compatibility of vehicles emissions control systems and fuel quality requirements. The representative from IMMA supported the proposal from OICA, AECC and CLEPA and recognized fuel quality was an important topic. IMMA would consider covering the issue once the transposition of UN GTR No. 2 into a UN Regulation would be completed.

72. GRPE adopted ECE/TRANS/WP.29/GRPE/2019/13 and requested the secretariat to submit it to WP.29 and AC.3 for consideration and vote at their November 2019 sessions.

## **XVII. Provisional agenda for the next session**

### **A. Next GRPE session**

73. The next GRPE session, including IWG meetings, is scheduled to be held in Geneva, Palais des Nations, starting on Monday, 13 January 2020, from 9.30 a.m. until Friday, 17 January 2020, at 12.30 p.m., subject to confirmation by the secretariat (see GRPE-80-01). Interpretation services would be provided from 14 January (2.30 p.m.) to 17 January (12.30 p.m.) 2020.

### **B. Provisional agenda for the next proper GRPE session**

74. 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) UN Regulations Nos. 68 (Measurement of the maximum speed, including electric vehicles), 83 (Emissions of  $M_1$  and  $N_1$  vehicles), 101 (CO<sub>2</sub> emissions/fuel consumption) and 103 (Replacement pollution control devices);
  - (b) UN 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));
  - (c) Worldwide harmonized Real Driving Emissions test procedure.
4. Heavy duty vehicles:
  - (a) UN Regulations Nos. 49 (Emissions of compression ignition and positive ignition (LPG and CNG) engines) and 132 (Retrofit Emissions Control devices (REC));
  - (b) UN 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));
  - (c) Worldwide provisions for Heavy Duty vehicles Fuel Economy.
5. UN Regulations Nos. 24 (Visible pollutants, measurement of power of C.I. engines (Diesel smoke)), 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) UN Regulations Nos. 96 (Diesel emission (agricultural tractors)) and 120 (Net power of tractors and non-road mobile machinery);
  - (b) UN Global Technical Regulation No. 11 (Non-road mobile machinery engines).
7. Particle Measurement Programme (PMP).
8. Motorcycles and mopeds:
  - (a) UN Regulations Nos. 40 (Emission of gaseous pollutants by motor cycles) and 47 (Emission of gaseous pollutants of mopeds);
  - (b) UN 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);
  - (c) Environmental and Propulsion Performance Requirements (EPPR) for L-category vehicles.
9. Electric Vehicles and the Environment (EVE);
  - (a) UN GTR on the Determination of Electrified Vehicle Power (DEVPP);
  - (b) Other activities of IWG on EVE.
10. Mutual Resolution No. 2 (M.R.2).
11. International Whole Vehicle Type Approval (IWVTA).
12. Vehicle Interior Air Quality (VIAQ).
13. Priority topics for GRPE activities
14. Election of officers
15. Any other business.

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

75. The following informal meetings were scheduled to be held, subject to confirmation:

<i>Date</i>	<i>Group</i>	<i>Acronym</i>	<i>Time</i>
Monday, 13 January 2020	Electric Vehicles and the Environment	EVE	9.30 a.m. – 12.30 p.m.
	Particle Measurement Programme	PMP	2.30 p.m. – 5.30 p.m.
	Worldwide harmonized Light vehicles Test Procedure	WLTP	9.30 a.m. – 12.30 p.m. 2.30 p.m. – 5.30 p.m.
Tuesday, 14 January 2020	WLTP Sub Group EV	SG EV	9.30 a.m. – 12.30 p.m.
	Heavy Duty Fuel Economy Workshop	HDV FE	9.30 a.m. – 12.30 p.m.
	Global Real Driving Emissions	RDE	2.30 p.m. – 5.30 p.m.
Wednesday, 15 January 2020	Environmental and Propulsion Performance Requirements of L-category vehicles	EPPR	2.30 p.m. – 5.30 p.m.
	Global Real Driving Emissions	RDE	9.30 a.m. – 12.30 p.m.
	Environmental and Propulsion Performance Requirements of L-category vehicles	EPPR	9.30 a.m. – 12.30 p.m.
	Vehicle Interior Air Quality	VIAQ	9.30 a.m. – 12.30 p.m.

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

## Annex I

### List of informal documents (GRPE-79- ) distributed without an official symbol before and during the session

No.	(Author) Title	Follow-up
1	(Secretariat) Informal meetings in conjunction with the GRPE (proper) session: schedule and rooms reservation	A
2r1	(Secretariat) General information	A
3	(Secretariat) Highlights of the WP.29 Sessions of March 2019	A
4r2	(Chair and secretariat) Priority topics for GRPE activities	C
5	(CITA) Proposal to amend the 06 and 07 series of amendments to UN Regulation No. 83	C
6	(CITA) Summary of CITA international conference, Seoul, 2-4 April 2019	A
7	(Russian Federation) Particulate emissions from road and tyre wear	A
8r1	(WLTP) IWG on WLTP status report	A
9r3	(Secretariat) Provisional Annotated Agenda	A
10	(OICA) Clarification needed on GRPE-2017-02	A
11	(OICA) Updated information on OICA proposal for UN R101	A
12	(OICA) Workshop on FE Harmonization	A
13	(PMP) IWG on PMP status report	A
14r1	(PMP) ToR update for the IWG on PMP	A
15	(OICA) Proposal for Amendment to UN R83.07 - Definition of Permanent default	C
16	(OICA) Proposal for Amendment to UN R83.07 - Definitions to erase fault codes	C
17	(OICA) Proposal for Amendment to UN R83.07 - Introduction of Special denominator	C
18	(VIAQ) IWG on VIAQ status report	A
19	(WLTP) WLTP Transposition TF status report	A
20r1	(RDE) IWG on Global RDE status report	A
21	(EPPR) Consolidated amended version of UN GTR No. 2	B
22	(EPPR) Technical report on the development of Amendment 4 to UN GTR No. 2	B
23	(EPPR) Consolidated draft amendment to UN GTR No. 18 to include OBD 2	C
24	(EPPR) IWG on EPPR status report	A
25	(IWVTA) Compliance of GRPE UN Regulations with Schedule 4 of the 58 Agreement	A
26	(IWVTA) Introduction of the new UNECE Numbering System	A
27r1	(OICA) Amendments to ECE/TRANS/WP.29/GRPE/2019/11	B
28r1	(EVE) IWG on EVE status report	A
29r1	(EVE) Draft revision of ECE/TRANS/WP.29/AC.3/53	B

#### Notes:

- A Consideration by GRPE completed or to be superseded;
- B Adopted;
- C Further consideration on the basis of a revised proposal.
- D Distribute at the January 2020 session with an official symbol.

## Annex II

### Informal meetings held in conjunction with the GRPE session

<i>Date</i>	<i>Time</i>	<i>Group</i>	<i>Acronym</i>
20 May 2019	9:30 a.m. - 12:30 p.m. 2:30 p.m. - 5:30 p.m.	Worldwide harmonized Light vehicles Test Procedure	WLTP
	10:00 a.m. - 13:30 p.m.	EVE sub group drafting DEVP	EVE
21 May 2019	9:30 a.m. - 12:30 p.m. 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.	WLTP Sub-Group on Electric Vehicles	SG EV
	2:30 p.m. - 5:30 p.m.	EVE	EVE
22 May 2019	9:30 a.m. - 12:30 p.m.	Environmental and Propulsion Performance Requirements of L-category vehicles	EPPR
	9:30 a.m. - 12:30 p.m.	Global Real Driving Emissions	RDE



## 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@canada.ca	June 2021
Particle Measurement Programme (PMP) (group)	Giorgio Martini, giorgio.martini@ec.europa.eu	Rainer Vogt rvogt@ford.com	June 2021
Vehicle Interior Air Quality (VIAQ) (group)	Andrey Kozlov, a.kozlov@nami.ru  Jong Soon Lim (vice-Chair), jongsoon@ts2020.kr	Mark Polster mpolster@ford.com	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	June 2020
Global Real Driving Emissions (RDE) (group)	Panagiota Dilara, Panagiota.DILARA@ec.europa.eu  Yoshiaki Kono (vice-Chair), kohno-y2jc@mlit.go.jp  Junhong Park (vice-Chair) pjhy98@korea.kr	Noriyuki Ichikawa (co-Technical Secretary), noriyuki_ichikawa@mail.toyota.co.jp Pablo Mendoza Villafuerte (co-Technical Secretary), pablo.mendoza-villafuerte@cnhind.com	January 2021

## Annex IV

### Adopted amendments to ECE/TRANS/WP.29/GRPE/2019/10

Adopted on the basis of amendments proposed during the session (see para. 32)

### A new Supplement to UN Regulation No. 115

## I. Proposal

*Insert new paragraph 2.5.1.4. to read:*

"2.5.1.4. With regard to the requirement of paragraph 2.5.1.1. (e), the **retrofit vehicle** family relation **applicable for the purpose of this Regulation only**, will be considered valid for both indirect and direct injection petrol vehicles if all the following conditions are satisfied:

- The retrofit system is "master-slave" according to the definition of paragraph 2.1.5.
- The retrofit system operates in indirect (port fuel) gas injection mode on direct petrol injection vehicles;
- At least one petrol direct injection vehicle has been tested as parent vehicle as defined in paragraph 2.5."

*Renumber paragraph 2.5.1.4. as 2.5.1.5.*

*Paragraph 2.5.1.5., amend to read:*

2.5.1.5. With regard to the requirement of paragraph 2.5.1.1.(f) in case of a "master-slave" system, as defined in paragraph 2.1.5., the **retrofit vehicle** family relation **applicable for the purpose of this Regulation only** will be considered valid regardless of the presence of the air injection or the EGR.

## II. Justification

This proposal amends UN Regulation No. 115 to list the conditions to be met by indirect and direct injection vehicles to be considered as belonging to the same vehicle family. Gasoline direct injection vehicles which operates in indirect gas injection should be listed in the same family as indirect gasoline injection vehicles. This is because as the applied gas injection technology is the same and provided that at least one such vehicle is tested as parent vehicle according to the requirements of this Regulation.

**This proposal has no implications on the emissions limits that remain those of the parent vehicle.**

## Annex V

### Adopted amendments to ECE/TRANS/WP.29/GRPE/2019/11

Adopted on the basis of GRPE-78-27-Rev.1 (see para. 34)

### A new Supplement to to UN Regulation No. 85

## I. Proposal

*Annex 5, Table 1, Footnote 9, amend to read:*

"<sup>9</sup> Charge air cooled engines shall be tested with charge air cooling, whether liquid or air cooled, but if the engine manufacturer prefers, a test bench system may replace the air cooled cooler. In either case, the measurement of power at each speed shall be made with the same pressure drop and temperature drop of the engine air across the charge air cooler on the test bench system as those specified by the manufacturer for the system on the complete vehicle.

**Alternatively, at the request of the manufacturer with the agreement of the type approval authority, the measurement of power (at each speed) may be made with the charge air cooler outlet temperature set as follows:**

$$T_{\text{outlet, bench, N}} = T_{\text{outlet, vehicle, N}} - (T_{\text{amb}} - 298)$$

**Where,**

**$T_{\text{outlet, bench, N}}$  is set temperature at engine speed N during the bench test (K)**

**$T_{\text{outlet, vehicle, N}}$  is measured temperature at engine speed N during a test of the complete vehicle test (K)**

**$T_{\text{amb}}$  is ambient temperature during the complete vehicle test (K)"**

## II. Justification

1. The current test method for measuring charge-air-cooled engines net power is not suitable for high power charge air-cooled engines. While waiting for the constant test condition (ref. Annex 5, 3.4.), the charge air cooler outlet temperature rises and the net power cannot be measured correctly.

2. To solve this problem, OICA proposes an alternative test method to "set the charge air cooler outlet temperature during bench test to temperature which was observed by vehicle test and corrected to the reference temperature specified in paragraph 5.2.1. of this Annex". This alternative method is well recognized in SAE J1349.

## Annex VI

### **Technical report on the development of Amendment 4 to UN GTR No. 2**

Adopted on the basis of GRPE-79-22 (see para. 49)

### **Technical report on the development of Amendment 4 to UN GTR No. 2 on the measurement procedure for two-wheeled motorcycles equipped with a positive or compression ignition engine with regard to the emissions of gaseous pollutants, CO<sub>2</sub> emissions and fuel consumption**

#### **I. Mandate**

1. Amendment 4 to global technical regulation (GTR) No. 2 was developed by the Informal Working Group (IWG) on Environmental and Propulsion Performance Requirements of L-category vehicles (EPPR). The Executive Committee (AC.3) of the 1998 Agreement adopted the authorisation to develop amendments to UN Global Technical Regulation (UN GTR) No. 2 at its 45th session (12 November 2015) (ECE/TRANS/WP.29/AC.3/36/Rev.1).

#### **II. Objectives**

2. Harmonization of test procedures for two-wheeled vehicles equipped with conventional combustion engine technology, but the objectives also include three-wheeled vehicles and other propulsion types in the next stage of work.
3. The scope of discussions does not cover light four-wheeled vehicles on emission related UN GTRs
4. The IWG first developed requirements for two-wheeled vehicles with conventional combustion engine technology.
5. Progressively other vehicles categories and other propulsion unit types will be considered to be included.
6. Entire revision of UN GTR No 2 to dedicate separate sections to test types I (tailpipe emission after cold start), II (idle / free acceleration emissions) and VII (energy efficiency)
7. Update the GTR for technical progress.

#### **III. Meetings held by Task Forces**

8. The proposed text of Amendment 4 to UN GTR No. 2 addressing the points listed in section II above were discussed at length and agreed upon by all participants in numerous Informal Working Group (IWG) meetings. These meeting took the format of eithers face-to-face or audio/web meetings.

#### **IV. Main resolutions agreed by the IWG**

What follows is a summary of the main resolutions agreed by the IWG are indicated explaining the reasons of such decisions.

9. Purpose.

This Regulation provides a worldwide-harmonized measurement method for the determination of the levels of gaseous and particulate pollutant emissions at the tailpipe, the emissions of carbon dioxide and the energy efficiency in terms of fuel consumption of two-wheeled motor vehicles that are representative for real world vehicle operation.

#### 10. Applicability.

The Informal Working Group followed the agreed terms of reference and prepared Amendment 4 to UN GTR No. 2 for two-wheeled vehicles under the 1998 Agreement. The IWG will, in due time prepare an equivalent UN Regulation for L-category vehicles in its scope under the 1958 Agreement.

#### 11. Fuels considered.

Only petrol and diesel were considered. India proposed to add alternative fuel to the scope of this UN GTR in order to support their national plans to fully implement any GTR developed under the UNECE umbrella. Nonetheless many Contracting Parties (CPs) were of the opinion that alternate fuel is not used for two-wheeled vehicles in large scale, adding alternate fuels to the scope of this GTR will increase the work load considering the timeline for formulation of GTR. However, addition of alternate fuel shall be taken up in further revision within the scope of this GTR.

#### 12. Definitions.

The definitions used in this GTR are taken from the draft common definitions incorporated in S.R.1 as well as from the work of the UN VPSD group operating under GRPE with the goal to harmonise high level powertrain definitions and from other international and regional legislation.

#### 13. Vehicle category.

Only two-wheeled vehicles are considered in the scope. Twinned wheel vehicles considered as two-wheeled vehicles are also in the scope, however BEV, HEV and H2 are not in scope at the moment. Priority was given for two-wheeled vehicles, although some of the CPs have regional cycle. Hence it was decided to address three-wheeled vehicles at a later stage. In the same line, both India and Japan were having concerns for implementing Class 0 vehicle in domestic regulation due to different maximum speed. Hence it was decided to leave the details of Class 0 vehicles as Contracting Party option.

#### 14. Performance Requirements.

Due to the disparity of level of stringencies present in different regions of the world, it was decided to define performance requirements at two levels: Principal performance requirements (or the most stringent ones for two-wheeled motorcycles) equivalent to the emission limits of Regulation (EU) 168/2013 (i.e. EUR 5 levels) and Alternative performance requirements (or less stringent) and corresponding to performances already in application in some CPs. This approach encourages the CPs to advance towards the most stringent performance in the shortest possible time without jeopardising their present regulatory framework.

#### 15. Particle Number (PN) Limit.

Although the topic was discussed by the IWG and since the base text do not include PN currently in Regulation (EU) 2019/129 (Euro 5 emission test provisions/technical requirements), it was finally decided not to consider PN emissions in the Amendment 4 to UN GTR 2.

#### 16. Reference fuel.

The principal performance requirements of this UN GTR are based on the use of reference fuels. The use of this standardised reference fuel for determining compliance with the Principal emission limits (norms) is considered as an ideal condition for ensuring the reproducibility of regulatory emission testing, and CPs are encouraged to use such fuel in their compliance testing. However, the Alternative performance requirements are applicable with the corresponding reference fuels (see points a) and b))

(a) For Type I Principal norms, the reference fuel for PI vehicles shall be either E0 or E5. For Alternative norms, regional reference fuels available in CPs can be used for Type I test. This decision was taken because according to the data presented by Japan (EPPR-21-Japan proposal GTR2 B2 (E0 Fuel)\_171011.pptx ), E0 and E5 can be considered equivalent for the tailpipe emissions, even if it is not the case for the power determination.

(b) For Alternate norms, regional reference fuels available with CPs can be used for Type I test (Alt A = India BS IV, Alt B = Euro 4 Alt C = Euro 3)

17. Temperature conversion.

After deliberation in EPPR-IWG and exchange with GRPE Chair and IWGs during 75th GRPE session, it was finally agreed that, wherever temperature conversion is required from degrees C to K, the following conversion factor shall be used:  $0^{\circ}\text{C} = 273.15 \text{ K}$

18. Use of Super-charger (definition).

Following an exchange via email between the EPPR Secretariat and the WLTP Coordinator, it was agreed not to use only the term "Supercharger" but to define "Forced Induction System", as umbrella definition, adding the relevant sub-definitions for "Super-charger" and "Turbocharger"

19. Open/Closed system.

In the EPPR-22 IWG meeting India raised concerns that an open system might create further dilution of the exhaust flow. IMMA provided data showing that the leakage effect is small enough to be able to be considered negligible in an open system. Therefore, in order to minimise the risk to create extra dilution and reach consensus, the IWG agreed to include both open and closed type (CFV type CVS system) in UN GTR No. 2, with the indication that it is up to the Type Approval Authority whether to accept or not the open type CFV-CVS system for the test, based on data and demonstration by the manufacturer that the leakage can be considered negligible.

20. Extraordinary Characteristics.

It was agreed to keep the note on Extraordinary Characteristics, because in the European Union Regulation is applicable for special vehicles.

21. Test room humidity.

A long and difficult discussion took place on whether it was needed to define the humidity range within which a test can be considered valid. It is known the importance of considering the humidity of either the air in the test cell or the intake air of the engine for the correct calculation of the final NO<sub>x</sub> emission factors. UN Regulation No. 83 indicates that the humidity in the test cell has to be within  $5.5 \leq H_a \leq 12.2$  (g H<sub>2</sub>O/kg dry air) for the test to be considered valid. IMMA argued that this imposed on some manufacturers an excess burden as in many regions that range of humidity was not easily achievable without having a conditioned test cell with the corresponding cost. It was noted that the correction factors originated from empirical data of the seventies, on engines without any after-treatment system. The regression analysis included empirical data from 2.85 to 17.2 g H<sub>2</sub>O/kg dry air. It should thus be investigated whether these correction factors were still valid nowadays for engines having after-treatment technology. Finally, an agreement by the CPs was reached by not declaring a test void if performed outside the above range but it requests to apply appropriate correction factors. Further investigation by the CPs on the validity of the correction factors is encourage in order to extend this humidity range also to two-wheeled vehicles. The final test in the UN GTR No. 2 reflects these agreements by the following text: "The absolute humidity (H<sub>a</sub>) of either the air in the test cell or the intake air of the engine shall be measured, recorded and correction factors for NO<sub>x</sub> shall be applied."

22. HC applicable correction factors.

The IWG decided not to add any HC correction factors to the formula for calculating the corrected concentration of Hydrocarbon in the type II idle test, since ISO has not defined any applicable formula about this matter and no Contracting Party could find HC factors despite all the efforts made.

23. CO<sub>2</sub> tolerance (Test type VII, energy efficiency).

The IWG has discussed on the difference between the CO<sub>2</sub> declared by the manufacturer and that measured by the Approval Authority could be in order to keep the measured value declared by the manufacturer within +4%. While the European Commission proposed to keep the values given in the European Regulation; i.e. +4%, because it is not a tolerance in the

measurements, but a given excess for the declaration, India was of the opinion that the difference needs to be based on real data submitted by India EPPR-24-05, which reflects values from specific vehicle categories of Class 1, 2 and 3. India would have preferred policy aligned with real-world data. However, the final consensus was to retain the values given in the European regulation (i.e. +4%)

24. Reference mass,  $m_{ref}$ .

The IWG revised the different equations where either  $m_{ref}$  (reference mass of the vehicle) and  $m_k$  (unladen mass of the vehicle) appears. It was decided to use  $m_{ref}$  rather than  $m_k + 75$  kg when appropriate.

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