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### Inland Transport Committee

### World Forum for Harmonization of Vehicle Regulations

### Working Party on Noise

Seventieth session

Geneva, 11–13 September 2019

## Report of the Working Party on Noise on its seventieth session

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## I. Attendance

1. The Working Party on Noise and Tyres (GRBP) held its seventieth session from 11 to 13 September 2019 in Geneva. The meeting was chaired by Mr. S. Ficheux (France). 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.29/700/Rev.1): China, Czech Republic, Finland, France, Germany, Hungary, India, Italy, Japan, Netherlands, Norway, Poland, Republic of Korea, Russian Federation, South Africa, Spain, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland and United States of America. An expert from the European Commission (EC) participated. Experts from the following non-governmental organizations also participated: Association of European Wheel Manufacturers (EUWA), Bureau International Permanent des Associations de Vendeurs et Rechapeurs de pneumatiques (BIPAVER), International Motor Vehicle Inspection Committee (CITA), European Association of Automotive Suppliers (CLEPA), European Tyre and Rim Technical Organization (ETRTO), Motorcycle Manufacturers Association (IMMA), International Organization for Standardization (ISO), Imported Tyre Manufacturers Association (ITMA), International Organization of Motor Vehicle Manufacturers (OICA) and U.S. Tire Manufacturers Association.

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

*Documentation:* ECE/TRANS/WP.29/GRBP/2019/12, Informal documents GRBP-70-01 and GRBP-70-05

2. GRBP considered and adopted the agenda (ECE/TRANS/WP.29/GRBP/2019/12, as amended by GRBP-70-01). GRBP noted the running order proposed by the Chair (GRBP-70-05). The list of informal documents is contained in Annex I. The list of GRBP informal groups is reproduced in Annex VI.

## III. UN Regulation No. 9 (Noise of three-wheeled vehicles) (agenda item 2)

*Documentation:* ECE/TRANS/WP.29/GRBP/2019/22, ECE/TRANS/WP.29/GRBP/2019/23

3. The expert from IMMA presented draft amendments that introduce a mandatory test for Additional Sound Emission Provisions (ASEP) and correct an inconsistency in the ASEP exemption conditions for vehicles with variable gear ratios or automatic transmission with non-lockable gear ratios (ECE/TRANS/WP.29/GRBP/2019/22 and ECE/TRANS/WP.29/GRBP/2019/23). GRBP adopted both proposals and requested the secretariat to submit them to WP.29 and to the Administrative Committee (AC.1) for consideration and vote at their March 2020 sessions as a draft Supplement 1 to the 08 series of amendments to UN Regulation No. 9.

## IV. UN Regulation No. 41 (Noise emissions of motorcycles) (agenda item 3)

*Documentation:* ECE/TRANS/WP.29/GRBP/2019/24, ECE/TRANS/WP.29/GRBP/2019/25

4. The expert from IMMA proposed amendments with the aim to minimize proliferation of approval numbers from models with differences in vehicle exhaust and silencing systems

(ECE/TRANS/WP.29/GRBP/2019/25). The experts from Germany, Japan, Russian Federation and Spain commented on the proposal. The Chair invited IMMA to prepare a revised document for the next session.

5. The expert from IMMA proposed correcting an omission (ECE/TRANS/WP.29/GRBP/2019/24). GRBP adopted the document, but agreed to postpone its submission to WP.29 and AC.1, awaiting other amendment proposals.

## **V. UN Regulation No. 51 (Noise of M and N categories of vehicles) (agenda item 4)**

*Documentation:* ECE/TRANS/WP.29/GRBP/2019/13, Informal documents GRBP-70-06, GRBP-70-08-Rev.1, GRBP-70-12, GRBP-70-15, GRBP-70-26-Rev.1

6. On behalf of the Informal Working Group on Additional Sound Emission Provisions (IWG ASEP), the expert from Germany proposed clarifications and corrections (ECE/TRANS/WP.29/GRBP/2019/13). The expert from OICA suggested further modifications (GRBP-70-06). The expert of ISO proposed updates according to the latest revision of standard ISO 5130:2019 (GRBP-70-08-Rev.1). To facilitate the discussion, the expert from OICA prepared a consolidated version of amendments (GRBP-70-26-Rev.1). The expert from Italy pointed out the need for a transitional provision. Finally, GRBP adopted the proposal, as contained in Annex II, and requested the secretariat to submit it to WP.29 and AC.1 for consideration and vote at their March 2020 sessions as a draft Supplement 6 to the 03 series of amendments to UN Regulation No. 51.

7. GRBP took note of the progress of IWG ASEP (GRBP-70-12).

8. The expert from OICA reported on the progress of the Task Force on Measurement Uncertainties (TF MU) (GRBP-70-15). He wondered whether TF MU should become a new IWG and who could become Chair. GRBP agreed to continue work in the framework of the Task Force for the time being and took note that the expert from Norway would be willing to chair TF MU as of its next session, which was scheduled to take place on 28 and 29 November 2019 in Brussels.

## **VI. UN Regulation No. 59 (Replacement silencing systems) (agenda item 5)**

*Documentation:* ECE/TRANS/WP.29/GRBP/2019/15

9. The expert from Germany introduced a proposal for a new series of amendments aimed at transposing the modified requirements for non-original replacement exhaust silencing systems (NORESS) from UN Regulation No. 92 (Replacement exhaust silencing systems for motorcycles) into UN Regulation No. 59. GRBP adopted the proposal and requested the secretariat to submit it to WP.29 and AC.1 for consideration and vote at their March 2020 sessions as a draft 03 series of amendments to UN Regulation No. 59.

## **VII. Tyres (agenda item 6)**

### **A. UN Regulation No. 106 (Tyres for agricultural vehicles)**

*Documentation:* ECE/TRANS/WP.29/GRBP/2019/18

10. The expert from ETRTO introduced draft amendments (ECE/TRANS/WP.29/GRBP/2019/18). GRBP adopted the amendments and requested the secretariat to submit them to WP.29 and AC.1 for consideration and vote at their March 2020 sessions as a draft Supplement 18 to the original series of amendments to UN Regulation No. 106.

**B. UN Regulation No. 108 (Retreaded tyres for passenger cars and their trailers)**

*Documentation:* ECE/TRANS/WP.29/GRBP/2019/6

11. GRBP agreed to postpone consideration of ECE/TRANS/WP.29/GRBP/2019/6 to the next session.

**C. UN Regulation No. 109 (Retreaded tyres for commercial vehicles and their trailers)**

*Documentation:* ECE/TRANS/WP.29/GRBP/2019/17

12. GRBP agreed to postpone consideration of ECE/TRANS/WP.29/GRBP/2019/7 to the next session.

**D. UN Regulation No. 117 (Tyre rolling resistance, rolling noise and wet grip)**

*Documentation:* ECE/TRANS/WP.29/GRBP/2019/14, ECE/TRANS/WP.29/GRVA/2018/5, ECE/TRANS/WP.29/GRBP/2019/19, Informal documents GRB-68-12, GRBP-70-03, GRBP-70-20, GRBP-70-21-Rev.2, GRBP-70-22, GRBP-70-23

13. On behalf of the group of interested experts (GOIE) on snow tyre provisions, the experts from Germany and ETRTO introduced draft amendments which would allow the type approval of special use tyres that fulfil the requirements for snow performance in Annex 7 (ECE/TRANS/WP.29/GRBP/2019/14). The experts of China, Netherlands, Sweden, Switzerland and OICA raised several questions on the proposed new definitions and limits. The expert from EC made a reservation, because the EU member States should first reach a common position on the proposal which would set up new less stringent limits. The expert of the Russian Federation, being part of GOIE, volunteered to deliver a presentation at the next session with the aim to provide additional explanations. GRBP decided to continue this discussion at the next session.

14. The expert from ETRTO recalled the postponed proposal for amendments (ECE/TRANS/WP.29/GRVA/2018/5 and GRB-68-12) and presented complementary modifications (ECE/TRANS/WP.29/GRBP/2019/19, GRBP-70-21-Rev.2). Various experts posed clarifying questions, in particular, on the use of terms "repeatability" and "reproducibility". Following an in-depth discussion, GRBP adopted the proposals, as amended by Annex III, and requested the secretariat to submit them to WP.29 and AC.1 for consideration and vote at their March 2020 sessions as a draft Supplement 11 to the 02 series of amendments to UN Regulation No. 117.

15. GRBP was briefed on the activities of IWG on Wet Grip Performance of Tyres in a Worn State (IWG WGWT) (GRBP-70-23) and noted that IWG WGWT planned to submit

an informal document to the seventy-second session of GRBP (September 2020) and a working document for adoption at the seventy-third session (January 2021). GRBP agreed that IWG would be co-chaired by France and the European Commission. The GRBP Chair encouraged all experts to participate in IWG WGWT.

16. The expert of EC proposed enlarging the scope of IWG WGWT to C2/C3 tyres and some further modifications to its Terms of Reference (GRBP-70-03). The experts from France and Japan were of the view out that C1 tyres should remain a priority for IWG WGWT and that C2/C3 tyres should only be addressed afterwards. The experts from the Netherlands and ETRTO pointed out that the behaviour of C2/C3 tyres in a worn state is completely different from C1 tyres. GRBP decided to revert to the issue at the next session and requested IWG WGWT to consider this idea in the interim. GRBP agreed to other modifications to the Terms of Reference, as laid down in Annex IV.

17. The expert from ETRTO provided an update of tyre industry and ISO activities on improving the wet grip test method for passenger car tyres (C1) (GRBP-70-20) and indicated his intention to submit a working document to the next session of GRBP. The Chair encouraged GRBP experts to send their comments to ETRTO.

18. The expert of ETRTO pointed out the need for a new definition of "traction tyres", because the current definition did not well segregate real traction tyres from non-traction ones (GRBP-70-19). The experts from OICA commented on the document. The Chair invited ETRTO, in cooperation with OICA, to prepare a formal proposal for consideration at the next session.

## **E. UN Global Technical Regulation No. 16 (Tyres)**

*Documentation:* ECE/TRANS/WP.29/GRBP/2019/20,  
ECE/TRANS/WP.29/GRBP/2019/21, Informal documents GRBP-70-02, GRBP-70-17-Rev.1, GRBP-70-18-Rev.1

19. On behalf of the Informal Working Group on the UN Global Technical Regulation No. 16 on Tyres (IWG Tyre GTR), the expert from ETRTO introduced a draft proposal for amendment No. 2 to UN GTR No. 16 (Tyres), together with a technical report (ECE/TRANS/WP.29/GRBP/2019/20, ECE/TRANS/WP.29/GRBP/2019/21, GRBP-70-02, GRBP-70-17-Rev.1, GRBP-70-18-Rev.1). GRBP adopted the technical report and proposal, as modified by Annex V, and invited requested the secretariat to submit these documents to the March 2020 session of the Executive Committee of the 1998 Agreement (AC.3). GRBP thanked the Chair, Secretary and all participants of the IWG Tyre GTR for their dedicated work.

## **VIII. Draft UN Regulation on reversing alarm (agenda item 7)**

*Documentation:* Informal document GRBP-70-24

20. On behalf of the Task Force on Reverse Warning (TF RW), the expert from Japan reported on the progress of TF RW (GRBP-70-24). He mentioned that a draft new UN Regulation would be uploaded at the TF RW website<sup>1</sup> and invited GRBP experts to provide their comments by 18 October 2019.

21. GRBP noted that, in line with its guidance, the expert from Switzerland had informed the Working Party on General Safety (GRSG), at its April 2019 session, about the TF RW activities and had explained that a "pause switch" for reverse warning sound devices would

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<sup>1</sup> <https://wiki.unece.org/display/trans/TFRWS++8th+session%2C+Switzerland+September+2019>

be permitted if other safety devices (e.g. camera monitor systems) were activated. GRSG had welcomed the information and had agreed on the need to coordinate this subject between GRBP and GRSG to avoid overregulation of these devices. The expert from Switzerland stated that he would report GRPB-70-24 to GRSG at its forthcoming session in October. The Chair stated that he would inform WP.29 about the idea of producing a new UN Regulation and cooperation with GRSG.

## **IX. Exchange of information on national and international requirements on noise levels (agenda item 8)**

22. No information was reported under this agenda item.

## **X. Influence of road surface on tyre rolling sound emissions (agenda item 9)**

*Documentation:* ECE/TRANS/WP.29/GRBP/2019/2, Informal document GRBP-70-11

23. The expert from the Russian Federation reported on the feedback from GRBP experts on the Draft Resolution on Road Surface Labelling (GRBP-70-11). He indicated that replies had been received from Austria, Finland, France, Norway, Russian Federation, Switzerland and the United Kingdom of Great Britain and Northern Ireland. According to the expert, the main conclusions of the survey were as follows:

- The Draft Resolution on Road Surface Labelling (ECE/TRANS/WP.29/GRB/2019/2) in many aspects does not seem suitable for international implementation;
- There was not much interest expressed to pursue the issue of grading and labelling road surfaces in the framework of GRBP;
- GRBP and WP.29 do not seem to be appropriate fora to consider this issue, as it is currently out of their scope;
- The issue should be communicated to the European Committee for Standardization (its technical committee CEN/TC 227) and/or to the relevant ISO technical committee, if available.

24. GRBP agreed to the above conclusions and requested its Chair to bring them to the attention of WP.29.

## **XI. Proposal for amendments to the Consolidated Resolution on the Construction of Vehicles (agenda item 10)**

25. No issues were considered under this item.

## **XII. Development of the International Whole Vehicle Type Approval system (agenda item 11)**

*Documentation:* Informal document GRBP-70-13

26. GRBP noted that, at the November 2019 session of WP.29, IWG on the International Whole Vehicle Type Approval (IWVTA) would submit amendment proposals to the

original version and to the 01 series amendments to UN Regulation No. 0 as well as a proposal for the 02 series of amendments to UN Regulation No. 0. IWG also planned to submit a revised list of UN Regulations for IWVTA, Phase 2.

### **XIII. Highlights of the March and June 2019 sessions of the World Forum for Harmonization of Vehicle Regulations (agenda item 12)**

*Documentation:* Informal document GRBP-70-13

27. The secretariat reported on the highlights of the March and June 2019 sessions of WP.29 (GRBP-70-13). GRBP took note of this information.

### **XIV. Exchange of views on the future work of the Working Party on Noise and Tyres (agenda item 13)**

*Documentation:* Informal documents GRBP-70-10, GRBP-70-14, GRBP-70-25

28. The expert of OICA reported on a study with the aim to determine the interdependency between the rolling sound, rolling resistance and the main safety performances by carrying out tests according to regulatory or standard procedures (GRBP-70-25). The expert from OICA pointed out, that given the budget constraints, the study had focused on C1 tyres. The study results indicated a conflict between the rolling sound and safety performances, like wet grip, dry grip and lateral aquaplaning. According to the expert, a low level of rolling sound could not be proven as feasible without compromising other parameters essential for vehicle safety and CO<sub>2</sub> emission reduction. He added that a full study report would soon be available. Various experts thanked OICA for the study and indicated they would further consider its results. The Chair invited experts to transmit their comments to OICA, if any.

29. The Chair presented a revised document on priorities of the future work (GRBP-70-10). The expert from EC reported on their ongoing study on requirements and test procedures for the tyre pressure monitoring system (TPMS) for vehicle categories M<sub>2</sub>, M<sub>3</sub>, N<sub>2</sub>, N<sub>3</sub>, O<sub>3</sub> and O<sub>4</sub> (GRBP-70-14) which might result in preparing amendment proposals to UN Regulation No. 141 on TPMS. GRBP decided to come back to the list of priorities, once the outcome of the study would be known.

### **XV. Other business (agenda item 14)**

*Documentation:* ECE/TRANS/288, ECE/TRANS/WP.29/GRBP/2019/26, Informal documents GRBP-70-04, GRBP-70-07, GRBP-70-09, GRBP-70-16, GRBP-70-14, GRBP-70-19, GRBP-70-27

30. The expert from the Russian Federation presented GRBP-70-07 on the emissions of hazardous substances and particulate matters caused by wear of tyres and roadway, which contaminates urban atmosphere. GRBP took note of this information as well as of the position of the European Tyre and Rubber Manufacturer's Association (ETRMA) (GRBP-70-16). The expert from EC mentioned the ongoing European Union study on the subject. The Chair acknowledged the importance of this issue and recalled that it had been allocated to the Working Party on Pollution and Energy (GRPE) and its Informal Working Group on Particle Measurement Programme (IWG PMP).



31. The expert from Germany proposed amendments to UN Regulation No. 138 with the aim to introduce a maximum sound level for the acoustic vehicle alerting system (AVAS) at speeds greater than 20 km/h (GRBP-70-04). Following a brief discussion, the Chair invited the expert to submit a working document for consideration at the next session.
32. The expert of ISO reported on development of ISO 16254 and invited GRBP experts to participate in the evaluation process (GRBP-70-09).
33. The expert from France proposed an amendment to UN Regulation No. 28 which complemented paragraph 2 "Definition" with an "electronic" operation of the audible warning device (ECE/TRANS/WP.29/GRBP/2019/26). GRBP adopted the proposal and requested the secretariat to submit it to WP.29 and AC.1 for consideration and vote at their March 2020 sessions as a draft Supplement 6 to the original series of amendments to UN Regulation No. 28.
34. The secretariat reported that the Inland Transport Committee (ITC), at its eighty-first session in 2019, had adopted the ITC Strategy until 2030, invited its subsidiary bodies to follow-up by aligning their work with the strategy and requested the secretariat to take the necessary actions to promote the implementation of the strategy (ECE/TRANS/288, paras. 15 (a), (c) and (g)). Furthermore, the Committee had expressed its concern for the limited progress globally in meeting the Sustainable Development Goal targets on road safety and those of the United Nation Decade of Action for Road Safety (ibid, para. 64) (GRBP-70-27).
35. GRBP noted that, in order to help countries, particularly new contracting parties, to further implement legal instruments in the area of road safety, the secretariat had prepared the draft ITC Recommendations for Enhancing National Road Safety Systems for comments by the Working Parties. GRBP stressed the importance of this document and invited GRBP experts to transmit their comments to the secretariat by 1 November 2019 at the latest.
36. GRBP recalled its discussion on how to implement the new provisions of Revision 3 of the 1958 Agreement on "Unique Identifier" (UI) and agreed to resume it at the next session, in the light of ECE/TRANS/WP.29/2019/77 which had been submitted to the November 2019 session of WP.29 by the Informal Working Group on Database of the Exchange of Type Approval documentation (IWG DETA).
37. GRBP was informed that Mr. T. Stoffels, Netherlands, would no longer attend GRBP meetings, due to impending retirement. GRB thanked him for his valuable contributions and wished him success in the future.

## **XVI. Provisional agenda for the seventy-first session (agenda item 15)**

38. For its seventy-first session, scheduled to be held in Geneva from 28 to 31 January 2020, GRBP decided to keep the same structure of the provisional agenda and include, in particular, UN Regulations Nos. 41, 108, 109, 117 (document ECE/TRANS/WP.29/GRBP/2019/14 and Terms of Reference of IWG WGWT), 138 and the item on road surface labelling. GRBP also noted that the deadline for the submission of official documents to the secretariat would be 4 November 2019, twelve weeks prior to the session. The Chair called on GRBP experts to submit informal documents at least one week before the session in order to give other experts an ample opportunity to study them.

## **XVII. Election of officers (agenda item 16)**

39. In compliance with Rule 37 of the Rules of Procedure (TRANS/WP.29/700 and ECE/TRANS/WP.29/700/Amend.1), GRBP called for the election of officers. The representatives of the Contracting Parties, present and voting, elected unanimously Mr. Serge Ficheux (France) as Chair and Mr. Andrei Bocharov (Russian Federation) as Vice-Chair for the sessions of GRBP scheduled for the year 2020.

## Annex I

### List of informal documents (GRBP-70-...) distributed during the session

<i>Symbol</i>	<i>Transmitted by</i>	<i>Agenda item</i>	<i>Language</i>	<i>Title</i>	<i>Follow-up</i>
1	Secretariat	1	E	Updated provisional agenda for the seventieth session	(a)
2	IWG Tyre GTR	6 (e)	E	UN GTR No. 16 (Tyres)	(d)
3	EC	6 (d)	E	Revised Terms of Reference of IWG WGWT	(c)
4	Germany	14	E	Proposal for Supplement 2 to the 01 series of amendments to UN Regulation No. 138	(b)
5	Chair	1	E	Running order	(a)
6	OICA	6	E	Proposal for amendment to ECE/TRANS/WP.29/GRBP/2019/13	(d)
7	Russian Federation	14	E	Emissions of hazardous substances and particulate matters caused by wear of tyres	(a)
8-Rev.1	ISO	4	E	Proposal for Supplement 7 to the 03 series of amendments to UN Regulation No. 51	(d)
9	ISO	14	E	ISO 16254 technical measurement development	(a)
10	Chair	13	E	Allocation of GRBP priorities	(c)
11	Russian Federation	9	E	Feedback by GRBP experts on the Draft Resolution on road surface labelling	(c)
12	IEW ASEP	4	E	Status report	(a)
13	Secretariat	12, 13	E	General information and WP.29 highlights	(a)
14	EC	14	E	Study on requirements and test procedures for TPMS for vehicle categories M <sub>2</sub> , M <sub>3</sub> , N <sub>2</sub> , N <sub>3</sub> , O <sub>3</sub> and O <sub>4</sub>	(c)
15	TF MU	4	E	Status report	(a)
16	ETRMA	14	E	Statement on emission of particulate matters	
17-Rev.1	IWG Tyre GTR	6 (e)	E	Proposal for amendments to ECE/TRANS/WP.29/GRBP/2019/21	(d)
18-Rev.1	IWG Tyre GTR	6 (e)	E	Amendment No. 2 to UN GTR No. 16 (Tyres)	(d)
19	ETRTO	14	E	New traction definition	(b)
20	ETRTO	6 (d)	E	Wet grip test method improvement for C1 tyres	(b)
21-Rev.2	ETRTO	6 (d)	E	Modification of ECE/TRANS/WP.29/GRBP/2019/19	(d)
22	GOIE	6 (d)	E	Snow tyres provisions: status report	
23	IWG WGWT	6 (d)	E	Status report	(a)
24	TF RW	7	E	Status report	(a)
25	OICA	13	E	ACEA - tyre performance study: noise vs. other performances	(c)
26-Rev.1	OICA	4	E	Revision of ECE/TRANS/WP.29/GRBP/2019/13	(d)

<i>Symbol</i>	<i>Transmitted by</i>	<i>Agenda item</i>	<i>Language</i>	<i>Title</i>	<i>Follow-up</i>
27	Secretariat	14	E	ITC-related issues	(a)

*Notes:*

- (a) Consideration completed or superseded.
- (b) Continue consideration at the next session with an official symbol.
- (c) Continue consideration at the next session as an informal document.
- (d) Adopted and to be submitted to WP.29.

## Annex II

### Adopted amendments to UN Regulation No. 51 (based on ECE/TRANS/WP.29/GRBP/2019/13 and GRBP-70-26-Rev.1)

Paragraph 2.11.1., amend to read:

"2.11.1. In the case of vehicles of categories M<sub>1</sub>, N<sub>1</sub> and M<sub>2</sub> < 3,500 kg technically permissible maximum laden mass:

- (a) For front engine vehicles: the front end of the vehicle;
- (b) For mid-engine vehicles: the centre of the vehicle;
- (c) For rear engine vehicles: the rear end of the vehicle.

**For vehicles having multiple propulsion sources, the reference point is determined by the position of the propulsion source having the highest power. If there are multiple propulsion sources of equivalent power, then the position of the most forward propulsion source shall prevail."**

Paragraph 2.24., Table of symbols, amend to read:

"2.24. Table of Symbols

...

gear ratio i	—	Annex 3	3.1.2.1.4.1.	<del>first of two gear ratios for use in the vehicle test</del> gear ratio which provides an acceleration within the 5 per cent tolerance of the reference acceleration $a_{wot\_ref}$ or greater than the reference acceleration $a_{wot\_ref}$
gear ratio i+1	—	Annex 3	3.1.2.1.4.1.	second of two gear ratios, with an <del>engine speed acceleration</del> lower than gear ratio i
gear ratio i+2, i+3, ...	—	Annex 3	3.1.2.1.4.1.	gear ratios selectable for the pass-by test of Annex 3, if gear ratio i and gear ratio i+1 exceed an acceleration of 2.0 m/s <sup>2</sup>
k	—	Annex 3	3.1.2.1.4.1.	gear ratio weighting factor; value to be reported and used for calculations to the second decimal place

..."

Paragraph 2.26., amend to read:

"2.26. Stable acceleration

**For the purpose of this Regulation, three conditions are defined for stable acceleration.**

- ~~2.26.1. "Stable acceleration" applicable when acceleration needs to be calculated is given when the acceleration ratio between  $a_{wot\_testPP-BB}$  and  $a_{wot\_test}$  is less than or equal to 1.2.~~
- ~~2.26.2. "Unstable acceleration" means a deviation from the stable acceleration during acceleration.~~
- ~~2.26.2.1. Unstable acceleration might occur as well during the start of acceleration from low speeds when the powertrain will react by bumping and jerking on the acceleration request.~~
- 2.26.1. "Stable acceleration" applicable to all vehicles subject to this Regulation for low engine speed conditions, which eliminates power train reactions such as bumping and jerking.
- 2.26.2. "Stable acceleration" applicable to vehicles of category M<sub>1</sub>, N<sub>1</sub> and M<sub>2</sub> < 3,500 kg technically permissible maximum laden mass avoids acceleration delays in acceleration due to engine control application, at the moment when the acceleration unit is depressed. This is typically ensured by using pre-acceleration.
- 2.26.3. "Stable acceleration" for the purpose of Annex 7 is based on the assumption of a constant acceleration over the complete measurement distance between AA' and BB' plus the vehicle length."

Insert a new paragraph 11.12., to read:

- "11.12. Until 12 months after the date of entry into force of the Supplement 6, it shall not apply to extensions of existing approvals, originally granted prior to the date of entry into force of Supplement 6."

Annex 1, Appendix,

paragraph 2.1., amend to read:

- "2.1. Sound level of moving vehicle (Annex 3): ..... dB(A)
- 2.1.1. Selected mode for tests of the vehicle in motion: ....."

Paragraph 2.2., amend to read:

- "2.2. Sound level of stationary vehicle: ..... dB(A) at ..... min<sup>-1</sup> in mode .....<sup>2</sup>
- Sound level of stationary vehicle: ..... dB(A) at ..... min<sup>-1</sup> in mode .....<sup>1</sup>
- Sound level of stationary vehicle: ..... dB(A) at ..... min<sup>-1</sup> in mode .....<sup>1</sup>
- Sound level of stationary vehicle: ..... dB(A) at ..... min<sup>-1</sup> in mode .....<sup>1</sup>
- Sound level of stationary vehicle: ..... dB(A) at ..... min<sup>-1</sup> in mode .....<sup>1</sup>"

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<sup>2</sup> If applicable

Annex 3,

Paragraph 3.1.2.1., amend to read:

"3.1.2.1. Vehicles of category M<sub>1</sub>, N<sub>1</sub> and M<sub>2</sub> ≤ 3,500 kg technically permissible maximum laden mass:

The path of the centreline of the vehicle shall follow line CC' as closely as possible throughout the entire test, from the approach to line AA' until the rear of the vehicle passes line BB' +20 m.

If the vehicle is fitted with more than two-wheel drive, test it in the drive selection which is intended for normal road use.

If the vehicle is fitted with an auxiliary manual transmission or a multi-gear axle, the position used for normal urban driving shall be used. In all cases, the gear ratios for slow movements, parking or braking shall be excluded.

The test mass of the vehicle shall be according to the table of paragraph 2.2.1.

The test speed  $v_{\text{test}}$  is 50 km/h ± 1 km/h. The test speed shall be reached, when the reference point is at line PP'.

If the test speed is modified according to paragraph 3.1.2.1.4.1.(d-e) of Annex 3 to this Regulation, the modified test speed shall be used for both the acceleration and constant speed test."

Paragraph 3.1.2.1.1., amend to read:

"3.1.2.1.1. Power to mass ratio index (PMR)

PMR is defined as follows:

$PMR = (P_n / m_{ro}) * 1000 \text{ kg/kW}$ , where  $P_n$  is measured in kW and  $m_{ro}$  is measured in kg ~~and determined defined~~ according to ~~paragraph 2.2.1. of this Annex~~ **paragraph 2.4 of the main body.**

If two or more sources of propulsive power operate at the conditions of test specified in paragraph 3.1.2.1 of Annex 3 to this Regulation, the total engine net power,  $P_n$ , shall be the arithmetic sum of parallel propulsive engines on the vehicle. Applicable parallel propulsive engines are those power sources which provide forward motion to the vehicle in combination at the conditions of test specified in paragraph

Paragraph 3.1.2.1.4.1., amend to read:

"3.1.2.1.4.1. Vehicles with manual transmission, automatic transmissions, adaptive transmissions or CVTs tested with locked gear ratios

The following conditions for selection of gear ratios are possible:

- (a) If one specific gear ratio gives an acceleration in a tolerance band of ±5 per cent of the reference acceleration  $a_{\text{wot ref}}$ , not exceeding 2.0 m/s<sup>2</sup>, test with that gear ratio.
- (b) If none of the gear ratios give the required acceleration, then choose a gear ratio  $i$ , with an acceleration higher and a gear ratio  $i+1$ , with an acceleration lower than the reference acceleration. If the acceleration value in gear ratio  $i$  does not exceed 2.0 m/s<sup>2</sup>, use both gear ratios for the test. The weighting ratio in relation to the reference acceleration  $a_{\text{wot ref}}$  is calculated by:

$$k = (a_{\text{wot ref}} - a_{\text{wot}(i+1)}) / (a_{\text{wot}(i)} - a_{\text{wot}(i+1)})$$

- (c) If the acceleration value of gear ratio  $i$  exceeds  $2.0 \text{ m/s}^2$ , the first gear ratio shall be used that gives an acceleration below  $2.0 \text{ m/s}^2$  unless gear ratio  $i+1$  (or  $i+2$ , or  $i+3$  or ...) provides acceleration less than  $a_{\text{urban}}$ . In this case, two gears,  $i$  and  $i+1$  (or  $i+2$ , or  $i+3$  or ...) shall be used, including the gear  $i$  with acceleration exceeding  $2.0 \text{ m/s}^2$ . In other cases, no other gear shall be used. The achieved acceleration  $a_{\text{wot test}}$  during the test shall be used for the calculation of the part power factor  $k_p$  instead of  $a_{\text{wot ref}}$ .
- (d) If rated engine speed is exceeded in a gear ratio  $i$  before the vehicle passes BB' the next higher gear  $i+1$  shall be used. If the next higher gear  $i+1$  results in an acceleration below  $a_{\text{urban}}$ , the vehicle test speed,  $v_{\text{test}}$ , in the gear ratio  $i$  shall be reduced by  $2.5 \text{ km/h}$  and the gear ratio selection shall proceed as specified by the options given in this paragraph. In no case shall the vehicle test speed be reduced below  $40 \text{ km/h}$ .

If the rated engine speed is exceeded in gear ratio  $i$  before the vehicle passes BB' and the vehicle test speed is equal to  $40 \text{ km/h}$ , the higher gear ratio  $i+1$  is allowed even if  $a_{\text{wot test}}$  does not exceed  $a_{\text{urban}}$ .

The vehicle test speed in the higher gear ratio  $i+1$  shall be  $50 \text{ km/h}$ .

~~In the case of a vehicle not exempted from ASEP according to paragraph 6.2.3, gear  $i$  shall be tested and values reported ( $L_{\text{wot}}$  is  $n_{\text{wot}}$ , BB'  $i$ ,  $v_{\text{wot}}$ , BB'  $i$ ) in order to perform tests of Annex 7.~~

- (e) If no gear ratio is available with an acceleration below  $2.0 \text{ m/s}^2$ , the manufacturer shall, if possible take measures to avoid an acceleration value  $a_{\text{wot test}}$  greater than  $2.0 \text{ m/s}^2$ .

Table 1 in Appendix to Annex 3 provides examples for valid measures to control the downshift of gears or to avoid accelerations beyond  $2.0 \text{ m/s}^2$ . Any measure used by manufacturer for the above-mentioned purposes shall be documented in the test report."

Paragraph 3.1.2.2., amend to read:

"3.1.2.2. Vehicles of categories  $M_2 > 3,500 \text{ kg}$  technically permissible maximum laden mass,  $M_3$ ,  $N_2$ ,  $N_3$ :

[...]

When the reference point passes line BB', the engine speed  $n_{\text{BB'}}$  shall be between 70 and 74 per cent of speed  $S$ , at which the engine develops its rated maximum net power, and the vehicle speed shall be  $35 \text{ km/h} \pm 5 \text{ km/h}$ . Between line AA' and line BB' a stable acceleration condition according to definition 2.26.1. shall be ensured.

Target conditions of category  $M_3$ ,  $N_3$ :

When the reference point passes line BB', the engine speed  $n_{\text{BB'}}$  shall be between 85 and 89 per cent of speed  $S$ , at which the engine develops its rated maximum net power, and the vehicle speed shall be  $35 \text{ km/h} \pm 5 \text{ km/h}$ . Between line AA' and line BB' a stable acceleration condition according to definition 2.26.1. shall be ensured."

Paragraph 3.1.2.2.1.1., amend to read:



- "3.1.2.2.1.1. Manual transmission, automatic transmissions, adaptive transmissions or transmissions with continuously variable gear ratios (CVTs) tested with locked gear ratios

Stable acceleration condition **according to definition 2.26.1.** shall be ensured. The gear choice is determined by the target conditions.

The following conditions for fulfilling the target conditions in paragraph 3.1.2.2. of Annex 3 to this Regulation are possible:

- (a) If one gear choice fulfils both target conditions for the rotational engine speed  $n_{\text{target BB}'}$  and for the vehicle speed  $v_{\text{target BB}'}$ , test with that gear.
- (b) If more than one gear choice fulfils both target conditions for the rotational engine speed  $n_{\text{target BB}'}$  and for the vehicle speed  $v_{\text{target BB}'}$ , test in gear  $i$  that gives velocity  $v_{\text{BB}' \text{ gear } i}$  closest to 35 km/h.
- (c) If two gear choices fulfil both target conditions for the rotational engine speed  $n_{\text{target BB}'}$  and for the vehicle speed  $v_{\text{target BB}'}$ , and fulfil the following condition.

$$(v_{\text{target BB}' } - v_{\text{BB}' \text{ gear } i}) = (v_{\text{BB}' \text{ gear } i+1} - v_{\text{target BB}'})$$

then both gears are taken for further calculation of  $L_{\text{urban}}$ .

- (d) If one gear choice fulfils the target condition for the rotational engine speed  $n_{\text{target BB}'}$  but not the target condition for the vehicle speed  $v_{\text{target BB}'}$ , use two gears, gear<sub>x</sub> and gear<sub>y</sub>. The target conditions for the vehicle speed for these two gears are as follows:

gear<sub>x</sub>

$$25 \text{ km/h} \leq v_{\text{BB}'_x} \leq 30 \text{ km/h}$$

and

gear<sub>y</sub>

$$40 \text{ km/h} \leq v_{\text{BB}'_y} \leq 45 \text{ km/h}$$

Both gears, gear<sub>x</sub> and gear<sub>y</sub> shall fulfil the target rotational engine speed  $n_{\text{target BB}'}$ . Both gears shall be used for further calculation of  $L_{\text{urban}}$ .

If only one of the gears fulfils the target rotational engine speed,  $n_{\text{target BB}'}$ , test with that gear. This gear shall be used for further calculation of  $L_{\text{urban}}$ .

- (e) If none of the two gears fulfils the target rotational engine speed  $n_{\text{target BB}'}$  under condition d) then condition f) shall be chosen.
- (f) If no gear choice fulfils the target rotational engine speed choose the gear that fulfils the target vehicle velocity  $v_{\text{target BB}'}$  and is closest to the target rotational engine speed  $n_{\text{target BB}'}$ , but not higher than  $n_{\text{target BB}'}$ .

$$v_{\text{BB}' \text{ gear } i} = v_{\text{target BB}'}$$

$$n_{\text{BB}' \text{ gear } i} \leq n_{\text{target BB}'}$$

A stable acceleration condition **according to definition 2.26.1.** shall be ~~insured~~ **ensured**. If **such** a stable acceleration cannot be ~~insured~~ **ensured** in a gear, this gear shall be disregarded. In all conditions, the rated engine speed shall not be exceeded while the reference point of

the vehicle is in the measurement zone. If the rated engine speed is exceeded within the measurement zone, this gear shall be disregarded."

*Paragraph 3.1.3.*, amend to read:

"3.1.3. Interpretation of results  
For vehicles of categories M<sub>1</sub> and M<sub>2</sub> having a maximum authorized mass not exceeding 3,500 kg, and category N<sub>1</sub> the maximum A-weighted sound pressure level indicated during each passage of the vehicle ~~between the two lines AA' and BB'~~ **according to paragraphs 3.1.2.1.5. and 3.1.2.1.6.** shall be rounded to the first significant digit after the decimal place (e.g. XX,X)."

*Paragraph 3.2.5.3.*, amend to read:

"3.2.5.3. Measuring of noise in proximity to the exhaust (see appendix of Annex 3, Figure ~~3a~~ **2**)"

*Paragraph 3.2.5.3.1.2.*, amend to read:

"3.2.5.3.1.2. For vehicles having an exhaust provided with outlets spaced more than 0.3 m apart **or more than one silencer**, one **set of** measurement is made for each outlet. ~~The highest level shall be recorded.~~"

*Annex 3, paragraph 3.2.5.3.1.3.* amend to read:

"3.2.5.3.1.3. ~~In the case of an exhaust provided with two or more outlets spaced less than 0.3 m apart and which are connected to the same silencer, the microphone position is related to the outlet nearest to one extreme edge of the vehicle or, when such outlet does not exist, to the outlet which is highest above the ground.~~

**If a vehicle has two or more exhaust outlets spaced less than or equal to 0.3 m apart and connected to a single silencer, only one set of measurement shall be made. The microphone shall be located relative to the outlet furthest away from the vehicle longitudinal centreline, or when such outlet does not exist, to the outlet, which is highest above the ground."**

*Annex 3, paragraph 3.2.5.3.1.5.* amend to read:

"3.2.5.3.1.5. ~~For exhaust outlets located under the vehicle body, the microphone shall be located a minimum of 0.2 m from the nearest part of the vehicle, at a point closest to, but never less than 0.5 m from the exhaust pipe reference point, and at a height of 0.2 m above the ground, and not in line with the exhaust flow. The angularity in requirement in paragraph 3.2.5.3.1.2 may not be met in some cases.~~

**For vehicles, where the reference point of the exhaust pipe is not accessible, or located under the vehicle body, as shown in Figure 3b and 3c in Annex 3, because of the presence of obstacles which form part of the vehicle (e.g. spare wheel, fuel tank, battery compartment), the microphone shall be located at least 0.2 m from the nearest obstacle, including the vehicle body, and shall not be located under the vehicle. Its axis of maximum sensitivity shall face the exhaust outlet from the position least concealed by the above mentioned obstacles. In case the distance from the exhaust outlet to the other side of the vehicle is larger than 0.2 m (Figures 3c and 3d in Annex 3), the following distances of  $d_1$  and  $d_2$  shall be chosen:**

**Case 1:**

$d_1$  shall be equal to 0.5 m and the distance from the side (outer border of the vehicle) shall be at least 0.2 m.

$d_2$  shall be equal to 0.5 m and the distance from the side (outer border of the vehicle) shall be at least 0.2 m.

**Case 2 (if Case 1 is not fulfilled):**

$d_1$  shall be at least 0.5 m and the distance from the side (outer border of the vehicle) shall be equal to 0.2 m.

$d_2$  shall be at least 0.5 m and the distance from the side (outer border of the vehicle) shall be equal to 0.2 m.

**When several positions are possible, as shown in Figure 3c, the microphone position giving the lowest value of  $d_1$  or  $d_2$  shall be used."**

*Paragraph 3.2.5.3.2.1., amend to read:*

**"3.2.5.3.2.1. Target engine speed**

The target engine speed is defined as:

- (a) 75 per cent of the rated engine speed  $S$  for vehicles with a rated engine speed  $\leq 5,000 \text{ min}^{-1}$ ;
- (b)  $3,750 \text{ min}^{-1}$  for vehicles with a rated engine speed above  $5,000 \text{ min}^{-1}$  and below  $7,500 \text{ min}^{-1}$ ;
- (c) 50 per cent of the rated engine speed  $S$  for vehicles with a rated engine speed  $\geq 7,500 \text{ min}^{-1}$ .

If the vehicle cannot reach the engine speed as stated above, the target engine speed shall be 5 per cent below the maximum possible engine speed for that stationary test.

**For vehicles for which the engine speed is a fixed value, (for example, but not limited to, series hybrids) either above or below the target engine speed and cannot be adjusted by the accelerator, the test shall be carried out at the fixed engine speed.**

**In case the engine speed deviates from the applicable target engine speed, the engine speed used for the test and the reason for the deviation shall be documented in the test report and at paragraph 2.2. of Appendix 1 to Annex 1."**

*Paragraph 3.2.6., amend to read:*

**"3.2.6. Results for sound emitted by stationary vehicles**

~~At least three measurements for each test position shall be made. The maximum A-weighted sound pressure level indicated during each of the three measurements shall be recorded. The first three valid consecutive measurement results, within 2 dB(A), allowing for the deletion of non-valid results (see paragraph 2.1. except the specifications of the test site), shall be used for the determination of the final result for the given measurement position. The maximum sound level, for all measurement positions, and of the three measurement results, constitutes the final result.~~

**3.2.6.1. Single test position (outlet)**

For the vehicles equipped with one exhaust outlet or two or more exhaust outlets as specified in paragraph 3.2.5.3.1.3., the stationary sound of the vehicle shall be determined for one test position.

At least three measurements for a test position (outlet) shall be made.

The maximum A-weighted sound pressure level indicated during each of the three measurements shall be recorded to the first decimal place.

The first three valid consecutive measurement results, within 2 dB(A), allowing for the deletion of non-valid results (see paragraph 2.1. except the specifications of the test site), shall be used for the determination of the final result for the given measurement position.

The result for a test position (outlet) is the arithmetic average of the three valid measurements, mathematically rounded to the nearest integer value (e.g. 72.5 shall be noted as to 73 while 72.4 shall be noted as to 72).

**3.2.6.2. Multiple test positions (outlets)**

For vehicles equipped with multiple exhaust outlets as specified in paragraph 3.2.5.3.1.2., the stationary sound of the vehicle shall be determined for each test position, following the measurement and calculation principles above.

The reported sound pressure level shall be for the test position having the highest average sound pressure level.

**3.2.6.3. Modes**

If the vehicle has different modes according to the definition 2.25.1. the stationary sound of the vehicle shall be determined for each mode, following the measurement and calculation principles above.

The sound pressure level for each mode shall be reported according to 3.2.6.1. in case the vehicle has only a single test position (outlet) and according to 3.2.6.2. in case of multiple test positions (outlets).

**3.2.7. Stationary sound pressure level representative for the vehicle type<sup>3</sup>**

If the vehicle has only one mode and a single test position (outlet), the representative sound pressure level for the vehicle type is determined by the measurement result according to paragraph 3.2.6.1.

If the vehicle has only one mode but multiple test positions (outlets), the representative sound pressure level for the vehicle type is determined by the measurement result according to paragraph 3.2.6.2.

If the vehicle has multiple modes and one or more test positions (outlets), the representative sound pressure level for the vehicle type is determined by the measurement result according to paragraph 3.2.6.3. In the test report and paragraph 2.2. of appendix 1 to annex 1 the representative test result determined by the principles above and the name of the mode shall be documented for every mode. The representative sound pressure level for the vehicle type and its registration papers is the highest reported sound pressure level of all modes as documented in paragraph 2.2. of appendix 1 to annex 1."

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<sup>3</sup> See Figure 6 of Annex 3, Appendix

Annex 3 – Appendix, amend to read:

"Figure 3a

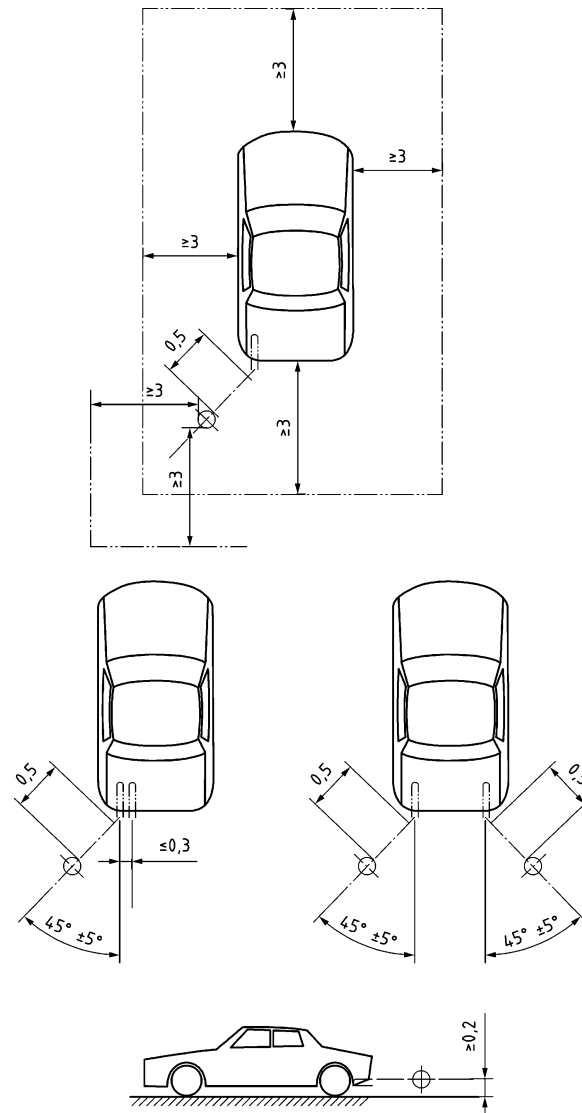


Figure 3b

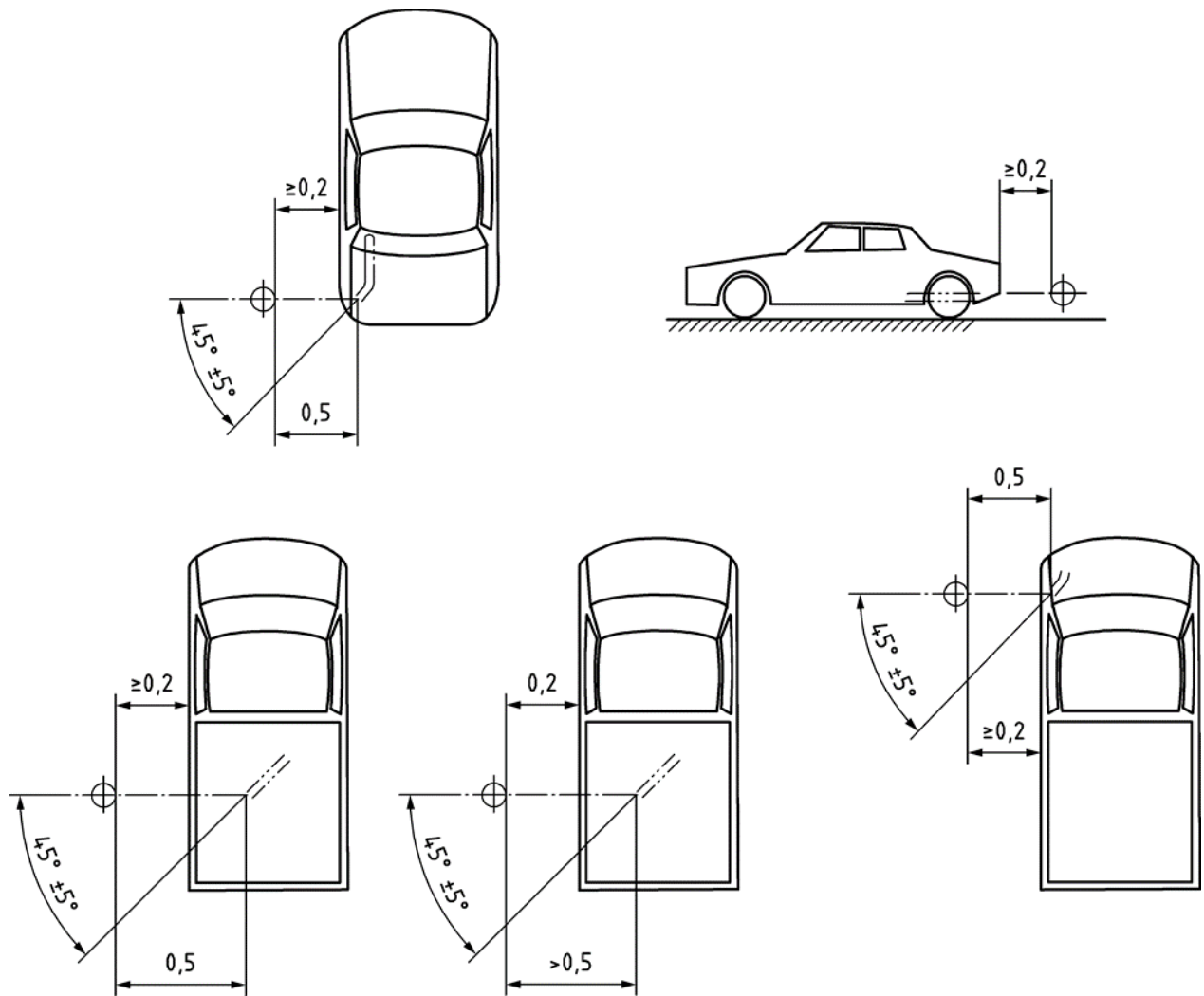


Figure 3c

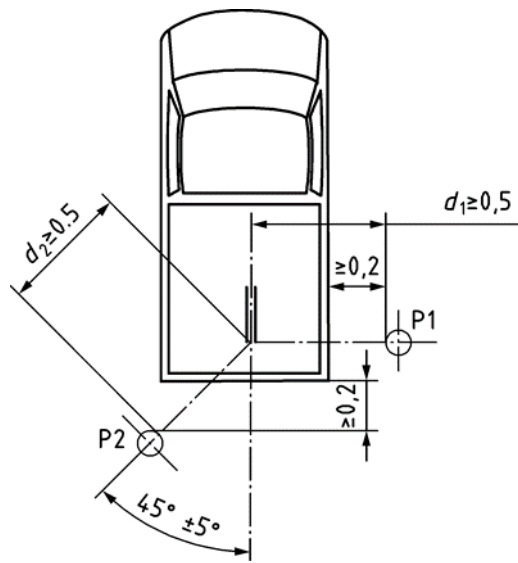
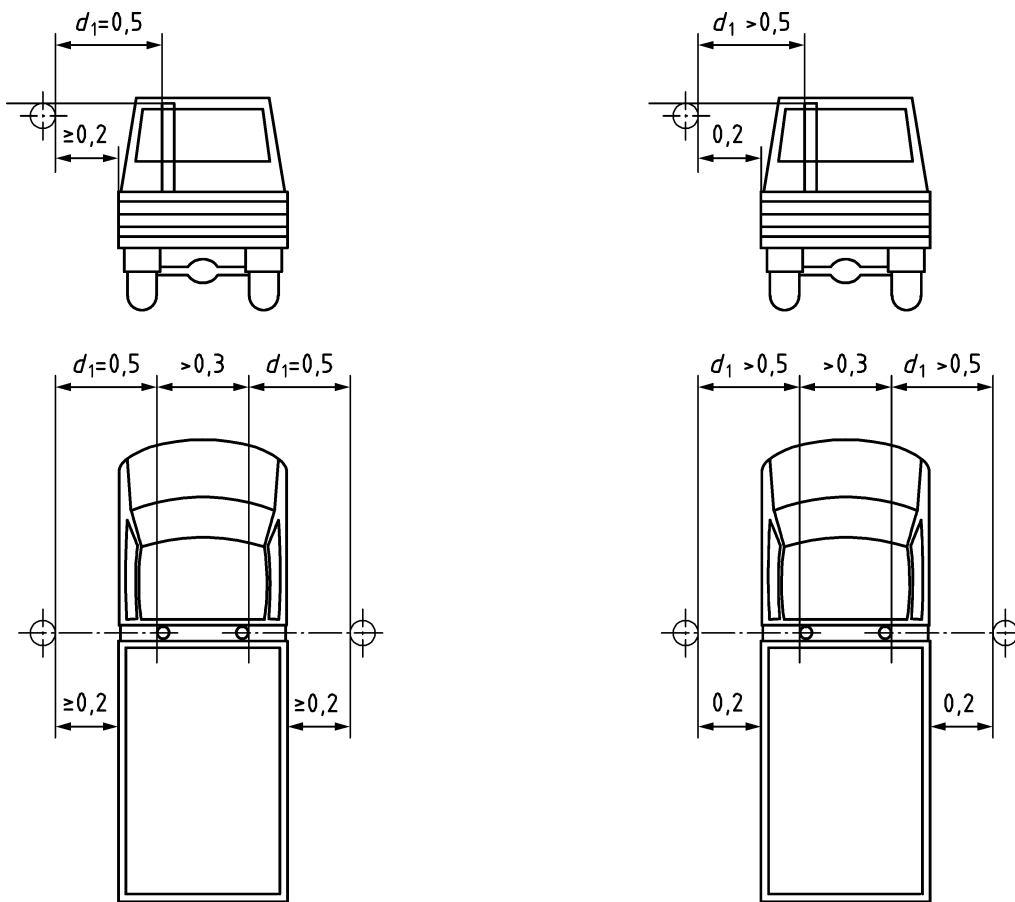


Figure 3d



''

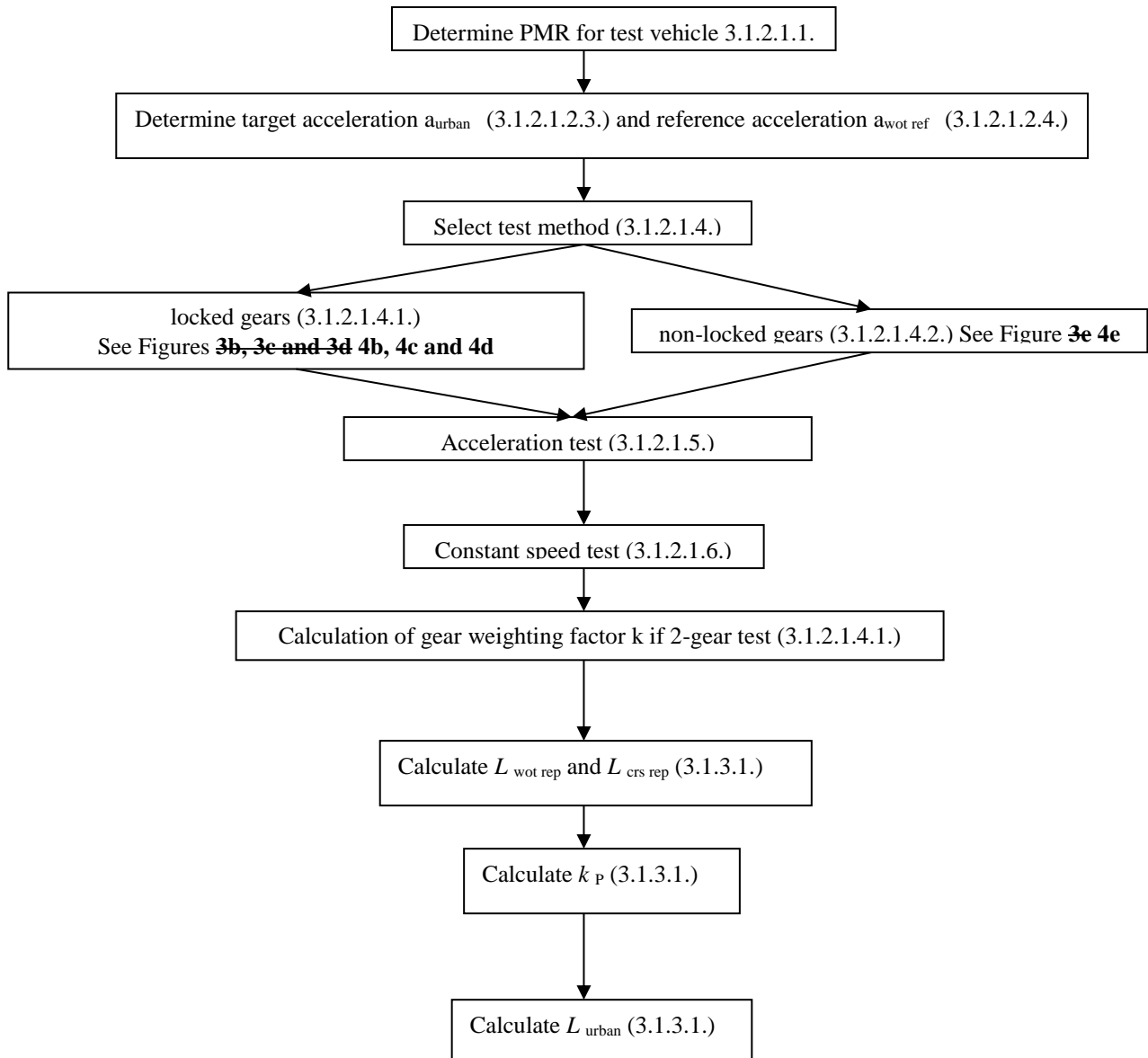


Annex 3, Appendix,

Figure 4a, amend to read

"Figure 4a

Flowchart for vehicles tested according to paragraph 3.1.2.1. of Annex 3 to this Regulation – ~~L<sub>urban</sub>~~ L<sub>urban</sub> computation

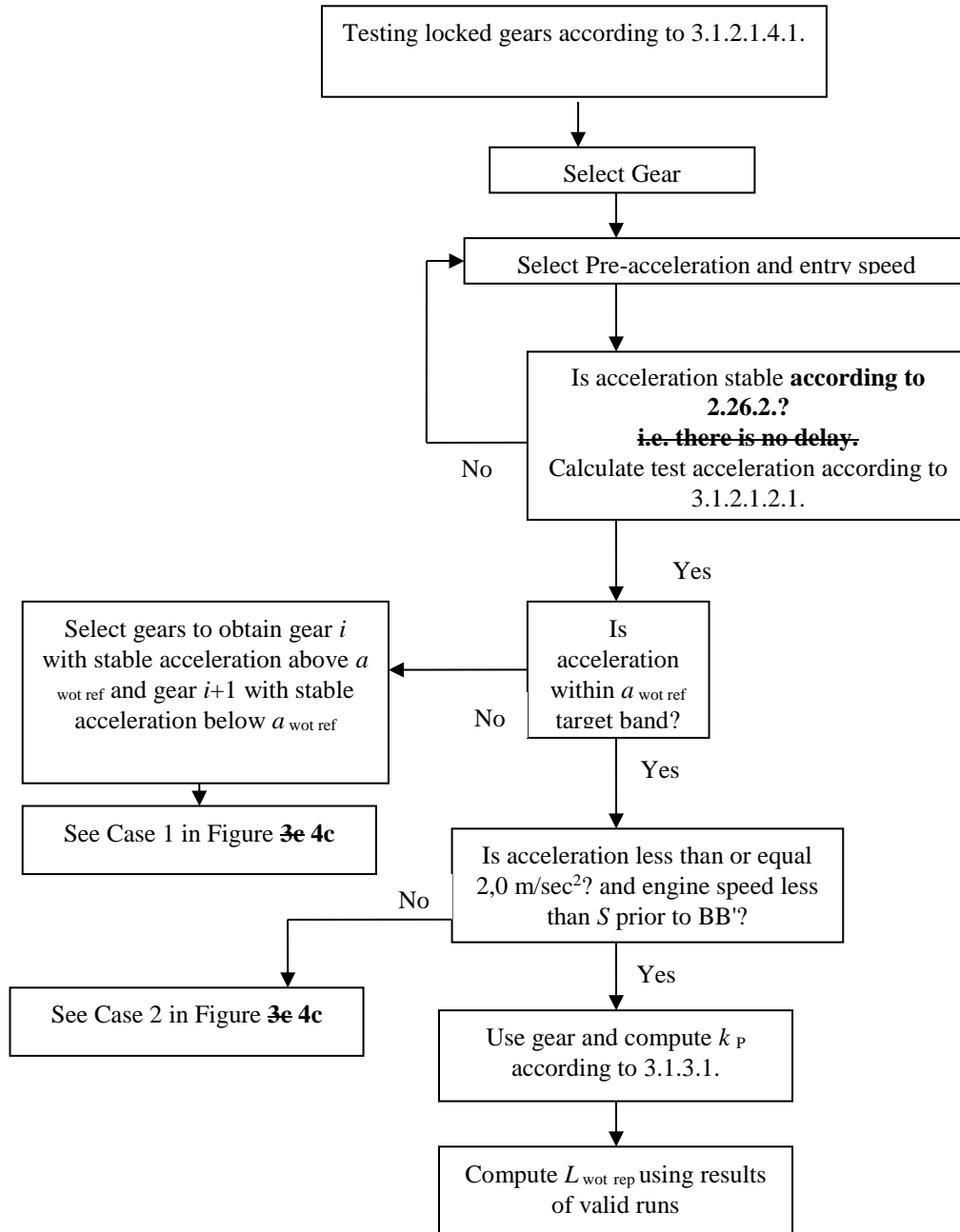


"

Figure 4b, amend to read:

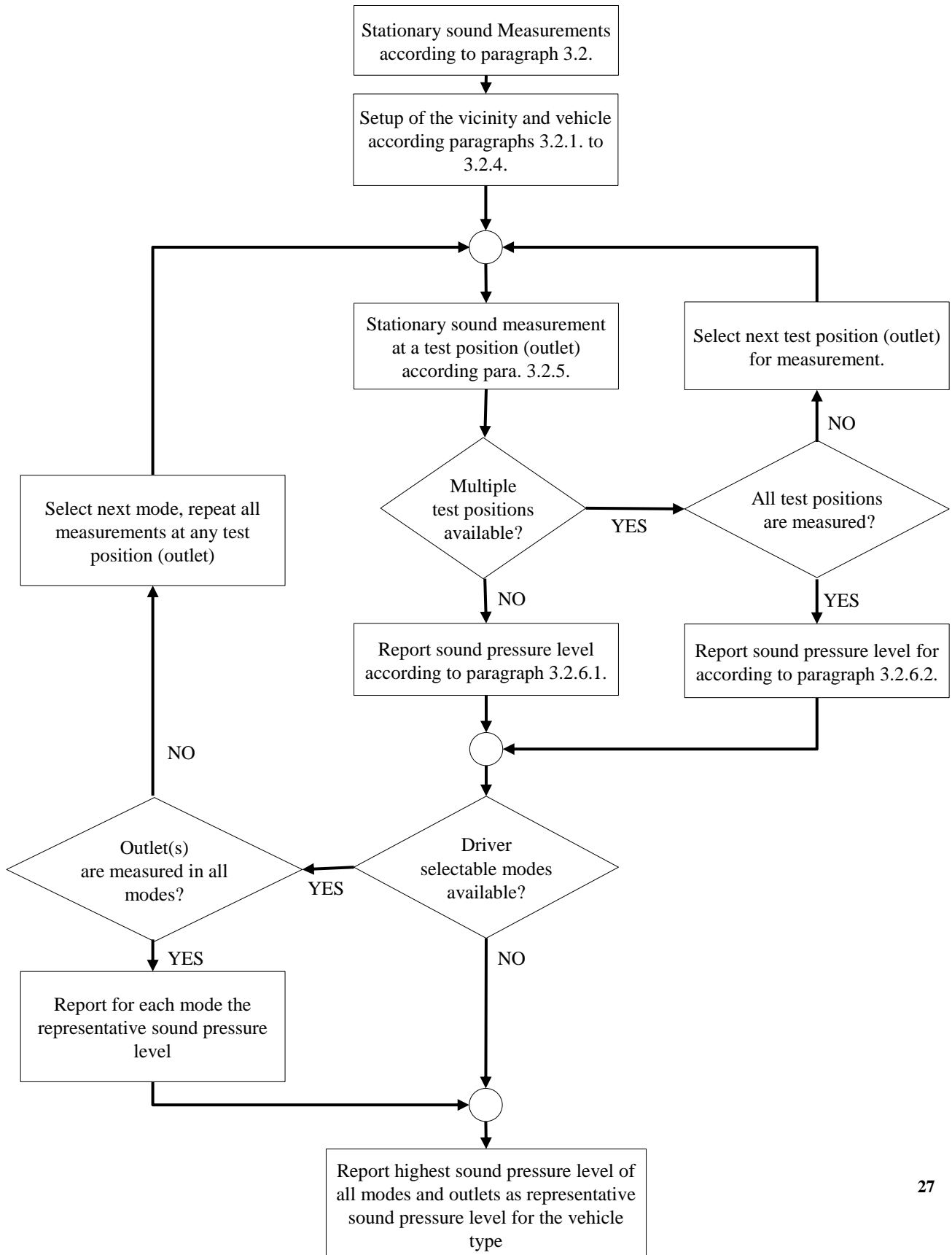
"Figure 4b

Flowchart for vehicles tested according to paragraph 3.1.2.1. of Annex 3 to this Regulation - Gear selection using locked gear. PART 1



Add a new figure 6:

**"Figure 6**  
**Flowchart for measurement and data processing of stationary sound according to**  
**paragraph 3.2.**



Annex 6, paragraph 2.1., amend to read:

- "2.1. The vehicle(s) under test shall be subjected to the test for measurement of sound of vehicle in motion as described in paragraph 3.1. of Annex 3.
- For vehicles of category M<sub>1</sub>, N<sub>1</sub> and M<sub>2</sub> ≤ 3,500 kg technically permissible maximum laden mass,
- the same mode, gear(s)/gear ratio(s), gear weighting factor k and partial power factor k<sub>p</sub> as determined during the type approval process **may be used, provided these information are available from the type approval test report for the applicable vehicle variant of the family. If not, these information shall be determined anew. The test report shall document which way of data processing was selected.**
  - the test mass m<sub>t</sub> of the vehicle shall be between 0.90 m<sub>ro</sub> ≤ m<sub>t</sub> ≤ 1.20 m<sub>ro</sub>."

Annex 7, paragraph 2.4., amend to read:

- "2.4. Target conditions
- The sound emission shall be measured in each valid gear ratio at the four test points as specified below. For all test points the boundary conditions as specified in paragraph 2.3. shall be met.
- The gear ratio is valid if all four points and the anchor point meet the specifications of paragraph 2.3. above. Any gear ratio for which this criteria is not fulfilled is invalid and not analysed further.
- The first test point P1 is defined by using an entry speed v<sub>AA,k1</sub> of 20 km/h ≤ v<sub>AA,k1</sub> < 20 km/h + 3 km/h.
- For P1, if a stable acceleration condition **according to the definition of 2.26.1** cannot be achieved ~~according to 2.26.2.1. in the definition section of this Regulation~~, the speed v<sub>AA,k1</sub> shall be increased in steps of 5 km/h until a stable acceleration is reached.
- For all points, ~~if a stable acceleration condition cannot be achieved according to the definition of 2.26.3~~ ~~2.26.1. the acceleration a<sub>wot\_test,PP-BB</sub> shall be calculated according the formula given in paragraph 3.1.2.1.2 of Annex 3~~ **verified by comparing the acceleration a<sub>wot\_test,AA-BB</sub> calculated between line AA' and line BB' with the acceleration a<sub>wot\_test,PP-BB</sub> calculated between line PP' and BB'.**
- If the ratio a<sub>wot\_test,PP-BB</sub> / a<sub>wot\_test,AA-BB</sub> does not exceed or is equal to 1,20, then proceed with the acceleration calculation between line AA' and Line BB'.**
- If the ratio a<sub>wot\_test,PP-BB</sub> / a<sub>wot\_test,AA-BB</sub> does exceed 1,20, then proceed with the acceleration calculation between line PP' and line BB'.**
- In case of non-locked transmission conditions where n<sub>BB\_ASEP</sub> is exceeded during the test, the following measures shall be considered separately or together:
- provisions of paragraph 2.5.1.
  - increased speed in steps of 5 km/h.

The test speed for the fourth test point P4 in any gear is defined by either

- $0.95 \times n_{BB\_ASEP} \leq n_{BB,k4} \leq n_{BB\_ASEP}$  or
- $v_{BB\_ASEP} - 3 \text{ km/h} \leq v_{BB,k4} \leq v_{BB\_ASEP}$  with  $v_{BB\_ASEP}$  as defined in paragraph 2.3.

The test speed for the other two test points is defined by the following formula:

Test Point  $P_j$ :  $v_{BB,kj} = v_{BB,k1} + ((j - 1) / 3) * (v_{BB,k4} - v_{BB,k1})$  for  $j = 2$  and  $3$  with a tolerance of  $\pm 3 \text{ km/h}$

Where:

$v_{BB,k1}$  = vehicle speed at BB' of test point  $P_1$

$v_{BB,k4}$  = vehicle speed at BB' of test point  $P_4$ ."

*Annex 7,*

*Paragraph 2.5.1., amend to read:*

"2.5.1. The path of the centreline of the vehicle shall follow line CC' as closely as possible throughout the entire test, starting from the approach of the reference point according to definition 2.11. of the main body to line AA' until the rear of the vehicle passes line BB'.

At line AA' the accelerator shall be fully depressed. To achieve a more stable acceleration **according definition 2.26.2.** or to avoid a downshift between line AA' and BB', pre-acceleration before line AA' may be used according to the provisions of paragraphs 3.1.2.1.2.1. and 3.1.2.1.2.2. of Annex 3. The accelerator shall be kept in depressed condition until the rear of the vehicle reaches line BB'.

In case of non-locked transmission conditions, the test may include a gear ratio change to a lower range and a higher acceleration. A gear change to a higher range and a lower acceleration is not allowed.

If possible, the manufacturer shall take measures to avoid that a gearshift leads to a condition not in compliance with the boundary conditions. For that, it is permitted to establish and use electronic or mechanical devices, such as alternate gear selector positions. If no such measures can be applied, the rationale shall be provided and documented in the technical report.

Table 1 in Appendix to Annex 3 provides examples for valid measures to control the downshift of gears. Any measure used by manufacturer for the above-mentioned purposes shall be documented in the test report."

*Paragraph 2.5.2., amend to read:*

"2.5.2. Measurements reading:

Per test point, one single run is carried out.

For every separate test run, the following parameters shall be determined and noted:

The maximum A-weighted sound pressure level of both sides of the vehicle, indicated during each passage of the vehicle **according to paragraph 3.1.2.1.5. of Annex 3**, shall be mathematically rounded to the first decimal place ( $L_{wot,kj}$ ). If a sound peak obviously out of character with the general sound pressure level is observed, the measurement shall be discarded. Left and right side may be measured simultaneously or separately. For further processing, the higher sound pressure level of both sides shall be used."

## Annex III

## Adopted amendments to ECE/TRANS/WP.29/GRBP/2019/19 (based on GRBP-70-21- Rev.2)

*Paragraph 2.20.9.*, amend to read and delete *footnote 9* related to this paragraph:

~~“2.20.9. “Measurement reproducibility  $\sigma_m$ ” means the capability of a machine to measure rolling resistance.<sup>9</sup>~~

*Insert a new paragraph 2.20.10.:*

~~“2.20.10. “Measurement repeatability” means the measurement precision under conditions where independent test results are obtained with the same method and procedure on identical test items in the same laboratory by the same operator using the same equipment within short intervals of time.”~~

*Annex 3,*

*Paragraph 1.1.1.*, amend to read:

“1.1.1. Calibration

At the beginning and at the end of every measurement session, the entire measurement system shall be checked by means of a sound calibrator that fulfils the requirements for sound calibrators of at least precision Class 1 according to IEC ~~60942:2017~~60942:1988. Without any further adjustment the difference between the readings of two consecutive checks shall be less than or equal to 0.5 dB(A). If this value is exceeded, the results of the measurements obtained after the previous satisfactory check shall be discarded.”

*Paragraph 4.3.*, renumber as 4.2. and amend to read:

~~“4.2.4.3.~~ Temperature correction

For Class C1 and Class C2 tyres, the ~~final result~~ **rolling sound levels  $L_i(\vartheta_i)$  obtained at the test surface temperature  $\vartheta_i$  (where  $i$  denotes the number of the single measurement)** shall be normalized to a test surface reference temperature  $\vartheta_{\text{ref}}$  by applying a temperature correction, according to the following formula:

$$L_i(\vartheta_{\text{ref}}) = L_i(\vartheta_i) + K(\vartheta_{\text{ref}} - \vartheta_i)$$

where:

~~$\vartheta_i$~~  = the measured test surface temperature,

$\vartheta_{\text{ref}} = 20\text{ }^\circ\text{C}$ ,

For Class C1 tyres, the coefficient  $K$  is:

– 0.03 dB(A)/ $^\circ\text{C}$  when  $\vartheta_i > \vartheta_{\text{ref}}$  and

– 0.06 dB(A)/ $^\circ\text{C}$  when  $\vartheta_i < \vartheta_{\text{ref}}$ .

For Class C2 tyres, the coefficient  $K$  is – 0.02 dB(A)/ $^\circ\text{C}$ .

Notwithstanding the above procedure, the temperature correction may be made only on the final reported tyre rolling sound level  $L_R$ , utilizing the arithmetic mean value of the measured temperatures, ~~if~~ if the measured test surface temperature does not change more than 5 °C within all measurements necessary for the determination of the sound level of one set of tyres, ~~the temperature correction may be made only on the final reported tyre rolling sound level as indicated above, utilizing the arithmetic mean value of the measured temperatures. Otherwise each measured sound level  $L_i$  shall be corrected, utilizing the temperature at the time of the sound recording. In this case the regression analysis below shall be based on the uncorrected rolling sound levels  $L_i(\vartheta_i)$ .~~

There will be no temperature correction for Class C3 tyres.”

Paragraph 4.2. (former), renumber as 4.3. and amend to read:

~~“4.3.4.2.~~ Regression analysis of rolling sound measurements

The tyre-road rolling sound level  ~~$L_R$~~   $L_R(\vartheta_{\text{ref}})$  in dB(A) is determined by a regression analysis according to:

$$\overline{L}_R = \overline{L} - a \cdot \overline{v}$$

$$L_R(\vartheta_{\text{ref}}) = \overline{L} - a \cdot \overline{\tau}$$

where:

$\overline{L}$  is the mean value of the **temperature-corrected** rolling sound levels  ~~$L_i$~~   $L_i(\vartheta_{\text{ref}})$ , measured in dB(A):

$$\overline{L} = \frac{1}{n} \sum_{i=1}^n L_i$$

$$\overline{L} = \frac{1}{n} \sum_{i=1}^n L_i(\vartheta_{\text{ref}})$$

$n$  is the **number of** measurements ~~number~~ ( $n \geq 16$ ),

~~$\overline{v}$~~  is the mean value of logarithms of speeds  $V_i$ :

$$\overline{v} = \frac{1}{n} \sum_{i=1}^n v_i \quad \text{with} \quad v_i = \lg\left(\frac{V_i}{V_{\text{ref}}}\right)$$

$$\overline{\tau} = \frac{1}{n} \sum_{i=1}^n \tau_i \quad \text{with} \quad \tau_i = \log_{10}\left(\frac{V_i}{V_{\text{ref}}}\right)$$

$a$  is the slope of the regression line in dB(A):

$$a = \frac{\sum_{i=1}^n (v_i - \overline{v})(L_i - \overline{L})}{\sum_{i=1}^n (v_i - \overline{v})^2}$$

$$a = \frac{\sum_{i=1}^n [(\tau_i - \overline{\tau})(L_i(\vartheta_{\text{ref}}) - \overline{L})]}{\sum_{i=1}^n (\tau_i - \overline{\tau})^2}$$



Paragraph 4.4., amend to read:

**“4.4.** In order to take account of any measuring instrument inaccuracies, ~~the results according to paragraph 4.3. above~~ **the temperature corrected tyre rolling sound level  $L_R(\vartheta_{ref})$  in dB(A)** shall be reduced by 1 dB(A) **and then rounded down to the nearest lower whole value to obtain the final result.”**

Paragraph 4.5., delete:

~~“4.5. The final result, the temperature corrected tyre rolling sound level  $L_R(\vartheta_{ref})$  in dB(A), shall be rounded down to the nearest lower whole value.”~~

Annex 3 - Appendix 1, amend to read:

“... ”

5. Valid test results: .....

Run No.	Test speed km/h	Direction of run	Sound level left <sup>a</sup> measured dB(A)	Sound level right <sup>a</sup> measured dB(A)	Air temp. °C	Track Test surface temp. °C	Sound level left <sup>a</sup> temp. corrected <sup>b</sup> dB(A)	Sound level right <sup>a</sup> temp. corrected <sup>b</sup> dB(A)	Comments
1									
2									
3									
4									
5									
6									
7									
8									

<sup>a</sup> Relative to the vehicle.

<sup>b</sup> Omit, if regression according to paragraph 4.3 of Annex 3 is made on the uncorrected rolling sound level values.

“... ”

Annex 6,

Paragraph 2.2., amend to read:

**“2.2.** Measuring rim ~~(see Appendix 2)~~

The tyre shall be mounted on a steel or light alloy measuring rim, as follows:

- (a) For Class C1 tyres, the width of the rim shall be as defined in ISO 4000-1:2015,
- (b) For Class C2 and C3 tyres, the width of the rim shall be as defined in ISO 4209-1:2001.

In cases where the width is not defined in the above-mentioned ISO standards, the rim width as defined by one of the standards organizations as specified in Appendix 4 may be used.”

Paragraph 6.5, delete all suggested modifications (i.e. leave unchanged the current text of the UN Regulation No. 117).

*Annex 6 - Appendix 1, paragraph 2.2, amend to read:*

“2.2. Run-out

**In case vehicle rims are used, the run-out** ~~Run-out~~ shall meet the following criteria:

(i) **for C1 tyres, C2 tyres and for C3 tyres with  $LI \leq 121$ :**

- (a) Maximum radial run-out: 0.5 mm,
- (b) Maximum lateral run-out: 0.5 mm;

(ii) **for C3 tyres with  $LI \geq 122$ :**

- (a) **Maximum radial run-out: 2.0 mm,**
- (b) **Maximum lateral run-out: 2.0 mm.”**

## Annex IV

### Revised Terms of Reference of the Informal Working Group on Wet Grip Performance for Tyres in a Worn State (IWG WGWT)

#### A. Introduction

1. At the sixty-ninth session of GRB, it was pointed out that the wet grip performance of tyres decreases with tyre wear, so the current testing (performed on new tyres) does not represent the worst-case situation. The process of adapting the requirements on tyres should continue, in particular to ensure that tyre performance is also assessed, if relevant, at the end of a tyre's life (in worn state) and to promote the idea that tyres should meet the requirements throughout their life and not be replaced prematurely. UN Regulation No. 117 now contains detailed provisions on noise, rolling resistance and wet grip performance of tyres that can be amended to take into account some other prescriptions.
2. It is proposed to create, starting in 2019, an informal working group to define prescriptions for wet grip performance of tyres in worn state (IWG WGWT).
3. This proposal establishes the Terms of Reference for the IWG WGWT.
4. The aim of the group is to propose an amendment to UN Regulation No. 117 under the 1958 Agreement.

#### B. Objectives

5. The scope and purpose are based on ECE/TRANS/WP.29/GRB/2019/6 and informal document GRB-69-23 submitted by France.
6. The future amendment to UN Regulation No. 117 will apply to new pneumatic tyres of class C1.
7. IWG WGWT shall:
  - Consider the scope and elaborate the target;
  - Evaluate the method for preparing a tyre to be tested in worn state **at its type-approval**;
  - Define the test conditions;
  - Describe the test methods;
  - Define the **type-approval thresholds of tyre wet grip performance in worn state**.
8. IWG WGWT shall work in the framework of the 1958 Agreement and shall report to GRBP.

#### C. Rules of Procedure

9. IWG WGWT shall be open to all participants of GRBP.
10. IWG shall be **co-chaired by France and the European Commission**. ETRTO shall act as Secretary.

11. The working language will be English.
12. All documents and/or proposals must be submitted to the Secretary of IWG in a suitable electronic format at least one week before a scheduled meeting.
13. An agenda and the latest draft document will be circulated to all members of IWG in advance of all scheduled meetings.
14. All IWG documentation will be made available on the dedicated ECE website.

#### **D. Timeline**

15. IWG shall aim to present a working document for adoption at seventy-third session of GRBP in January 2021. IWG shall present a progress report, including already achieved results, at the seventy-first session of GRB in January 2020 and a comprehensive proposal at the seventy-second session of GRB in September 2020.
16. The first IWG meeting is planned to be held in April 2019. The exact date and location are to be determined.

## Annex V

### Adopted amendments to ECE/TRANS/WP.29/GRBP/2019/21 (based on GRBP-70-17- Rev.1)

#### Part I,

##### Paragraph 62, amend to read:

"62. Definitions of "load index", "load capacity", "maximum load rating", "reference test inflation pressure", "standard reference test tyre (SRTT)" were added consistent with the amendments made in UN GTR No. 16 to harmonize concepts of load range and PSI Index by translating load range into inflation pressure ranges and replacing the term "PSI Index" with the term "Reference Test Inflation Pressure"."

##### Paragraph 72, amend to read:

"72. As described in paragraph 64 above, FMVSS 139 requirements relative to load range and UN PSI index (~~3.14 and 3.15~~), strength test and bead unseat test provisions were harmonized to translate load range into a corresponding reference test inflation pressure."

##### Paragraph 83, amend to read:

"83. Physical dimensions provisions were harmonized by deleting the previous section ~~3.5.1 3.20~~ and ~~3.5.2 3.21~~ adding a new section ~~3.20~~ **3.5.2**. Physical dimensions provisions were also harmonized by integrating provisions for measuring and calculating physical dimensions and assuring that all LT/C tyre sizes are addressed by the provisions. Additional provisions were added to address high flotation sizes."

##### Paragraph 84, amend to read:

"84. The high-speed performance test for LT/C tyres was harmonized. The harmonized test contains two sets of requirements: the first for LT/C tyres with speed symbols below "Q" and other for LT/C tyres with speed symbols greater than or equal to "Q". The informal working group concluded that for tyres with speed symbols below "Q" the FMVSS 139 test was the most severe then developed a modified UN Regulation No. 54 high-speed performance test that was equivalent to the FMVSS 139 high-speed performance test in terms of test severity. This modified UN Regulation No. 54 test represents a more efficient test than the FMVSS 139 high-speed performance test because it is of shorter duration, which impacts the capacity of testing facilities and reduces testing costs while representing a test that is comparable in terms of safety. Additionally, eliminating the break-in and cool down cycles further economizes laboratory resources without affecting test results. The results of the tyre industry testing programme were accepted by the informal working group without additional validation by a Contracting Party. For tyres with Speed Symbols "Q" and above the Amendment 2 of UN GTR No. 16 substituted the non-harmonized provisions of UN Regulation No. 54 by the new harmonized provisions of the modified load/speed endurance test method. A provision was also added to recognise a case of a tyre with an alternative service description, specifying that a second tyre of the same type should be tested according to the alternative service description unless a clear engineering justification is made that a single test represents the worst-case combination of load index and speed category symbol. **Consistent with UN Regulation No 54, no provisions were developed for LT/C tyres with speed symbol above "H".**"

## Annex VI

## GRBP informal groups

<i>Informal group</i>	<i>Chair(s) and Co-Chair(s)</i>	<i>Secretary</i>	<i>Expiry date of the mandate</i>
Quiet road transport vehicles (QRTV) for GTR	Mr. Ezana Wondimneh (USA) Tel: +1 202 366 21 17 Email: Ezana.wondimneh@dot.gov Mr. Ichiro Sakamoto (Japan) Tel:+81 422 41 66 18 Fax:+81 422 76 86 04 Email: i-saka@ntsel.go.jp	Mr. Andreas Vosinis (Directorate General Growth, European Commission) Tel:+ 32 2 2992116 Email: andreas.vosinis@ec.europa.eu	December 2018
Additional sound emission provisions (ASEP)	Mr. Bernd Schüttler (Germany) Phone: +49 228 99300 4372 Fax: +49 228 99300807 4372 Email: bernd.schuetzler@bmvi.bund.de Mr. Dongming Xie (China) Phone: +86 22 843 79284 Fax: +86 22 84379259 Email: xiedongming@catarc.ac.cn Mr. Kazuhiro Okamoto (Japan) Phone: +81 422 41 3227 Fax: +81 422 41 3232 Email: k-okamot@shinsa.ntsel.go.jp	Ms. Françoise Silvani (OICA) Tel: +33 1 76 85 05 92 Fax: +33 1 76 86 92 89 Email: francoise.silvani@renault.com	September 2020
Wet grip performance for tyres in worn state (WGWT)	Mrs. Elodie Collot (France) Phone: +33 170 80 17 43 Fax: + 33 1 70 80 17 17 Email: elodie.collot@utacceram.com Mr. Andreas Vosinis (Directorate General Growth, European Commission) Tel:+ 32 2 299 21 16 Email: andreas.vosinis@ec.europa.eu	Mr. Nicolas de Mahieu (ETRTO) Phone: +32 23 44 40 59 Email: info@etrto.org	September 2020