

22 November 2023

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## Agreement

### **Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations\***

(Revision 3, including the amendments which entered into force on 14 September 2017)

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#### **Addendum 50 – UN Regulation No. 51**

#### **Revision 3 - Amendment 8**

Supplement 8 to the 03 series of amendments – Date of entry into force: 24 September 2023

#### **Uniform provisions concerning the approval of motor vehicles having at least four wheels with regard to their sound emissions**

This document is meant purely as documentation tool. The authentic and legal binding texts is: ECE/TRANS/WP.29/2023/2.



**UNITED NATIONS**

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\* Former titles of the Agreement:

Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958 (original version); Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, done at Geneva on 5 October 1995 (Revision 2).



Paragraph 2.24., amend to read:

"2.24 Table of symbols

...	...	...	...	...
$L_{crs(i)}$	dB(A)	Annex 3	3.1.3.4.1.2.	vehicle sound pressure level at constant speed test for gear i; value to be reported and used for calculations to the first decimal place
$L_{crs(i+1)}$	dB(A)	Annex 3	3.1.3.4.1.2.	vehicle sound pressure level at constant speed test for gear (i + 1); value to be reported and used for calculations to the first decimal place
$L_{crs\ rep}$	dB(A)	Annex 3	3.1.3.4.1.2.	reported vehicle sound pressure level at constant speed test; value to be reported and used for calculations to the first decimal place
$L_{wot(i)}$	dB(A)	Annex 3	3.1.3.4.1.2.	vehicle sound pressure level at wide-open-throttle test for gear i; value to be reported and used for calculations to the first decimal place
$L_{wot(i+1)}$	dB(A)	Annex 3	3.1.3.4.1.2.	vehicle sound pressure level at wide-open-throttle test for gear (i + 1); value to be reported and used for calculations to the first decimal place
$L_{wot\ rep}$	dB(A)	Annex 3	3.1.3.4.1.2.	reported vehicle sound pressure level at wide-open-throttle; value to be reported and used for calculations to the first decimal place
$L_{urban}$	dB(A)	Annex 3	3.1.3.4.1.2.	reported vehicle sound pressure level representing urban operation; value to be reported mathematically rounded to the nearest integer
...	...	...	...	...

"

Paragraph 11, add new subparagraphs 11.14. and 11.15., to read:

"11.14. Supplement 8 does not apply to existing type approvals, originally granted prior to the date of entry into force of Supplement 7.

11.15. From the entry into force of Supplement 8, ISO 10844:2021 shall be accepted for all approvals granted under this Regulation. Until five years from the entry into force of Supplement 8, ISO 10844:2014 shall be accepted for all approvals granted under this Regulation."

Annex 3,

Paragraph 2.1.1., amend to read:

"2.1.1. Test site outdoor

The surface of the test track and the dimensions of the test site shall be in accordance with ISO 10844:2021."

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:

$PMR = (P_n / m_{ro}) * 1000$  kg/kW, where  $P_n$  is measured in kW and defined according to paragraph 2.8. of the main body and  $m_{ro}$  is measured in kg and defined according to paragraph 2.4. of the main body.

The PMR with no dimension is used for the calculation of acceleration."

Paragraph 3.1.2.1.3., amend to read:

"3.1.2.1.3. Partial power factor  $k_P$

The partial power factor  $k_P$  (see paragraph 3.1.3.4.1.2.) is used for the weighted combination of the test results of the acceleration test and the constant speed test for vehicles of category  $M_1$  and  $N_1$  and  $M_2 \leq 3,500$  kg technically permissible maximum laden mass

In cases other than a single gear test,  $a_{wot\ ref}$  shall be used instead of  $a_{wot\ test}$  (see paragraph 3.1.3.4.1.2.)."

Paragraph 3.1.3.4.1.2., amend to read:

"3.1.3.4.1.2. [...]

The final result is calculated by combining  $L_{wot\ rep}$  and  $L_{crs\ rep}$ . The equation is:

$$L_{urban} = L_{wot\ rep} - k_P * (L_{wot\ rep} - L_{crs\ rep})$$

The weighting factor  $k_P$  gives the part power factor for urban driving. In cases other than a single gear test,  $k_P$  is calculated by:

$$k_P = 1 - (a_{urban} / a_{wot\ ref})$$

If only one gear was specified for the test,  $k_P$  is given by:

$$k_P = 1 - (a_{urban} / a_{wot\ test})$$

In cases where  $a_{wot\ test}$  is less than  $a_{urban}$ :

$$k_P = 0$$

In cases where the PMR of the vehicle is lower than 25 the final result  $L_{urban}$  is the result of the acceleration test:

$$L_{urban} = L_{wot\ rep}$$

In cases where  $L_{wot,rep}$  is less than  $L_{crs,rep}$ :

$$k_P = 1$$

In cases where  $L_{wot,rep}$  is less than  $L_{crs,rep}$  the final result  $L_{urban}$  is the result of the cruise test:

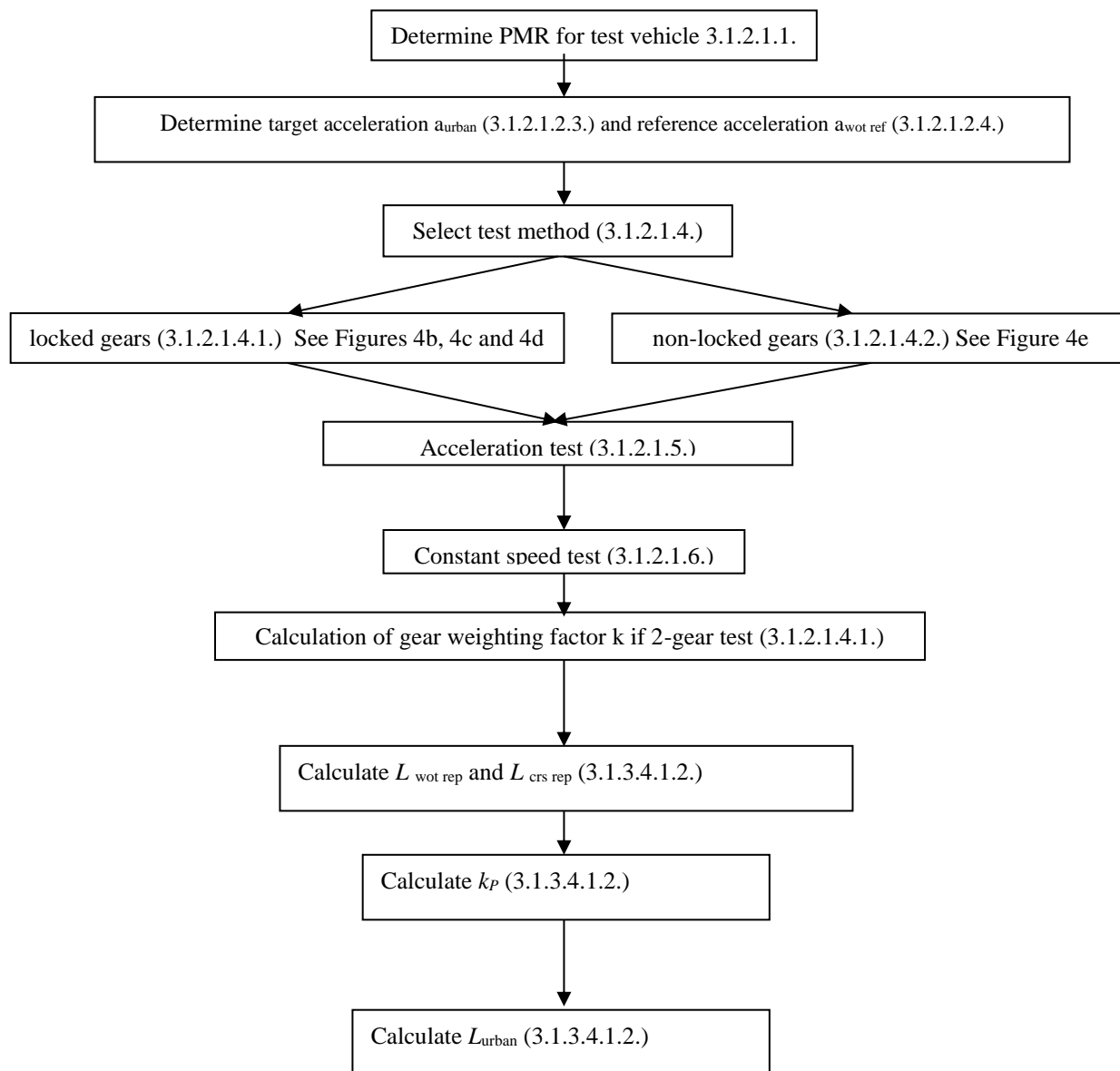
$$L_{urban} = L_{crs,rep}$$

Annex 3, Appendix 1,

Figure 4a, amend to read:

"Figure 4a

**Flowchart for vehicles tested according to paragraph 3.1.2.1. of Annex 3 to this Regulation –  $L_{\text{urban}}$  computation**

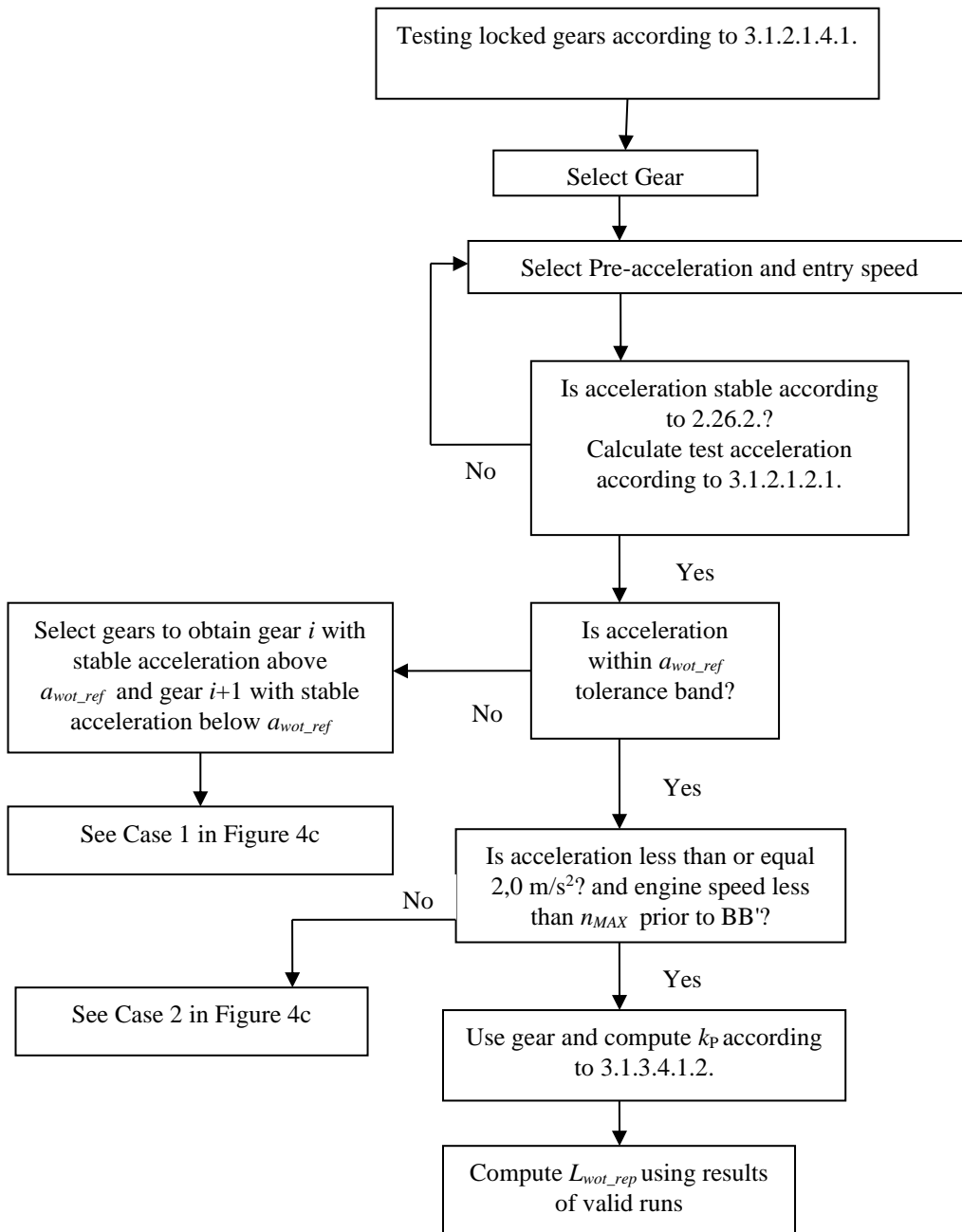


"

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**

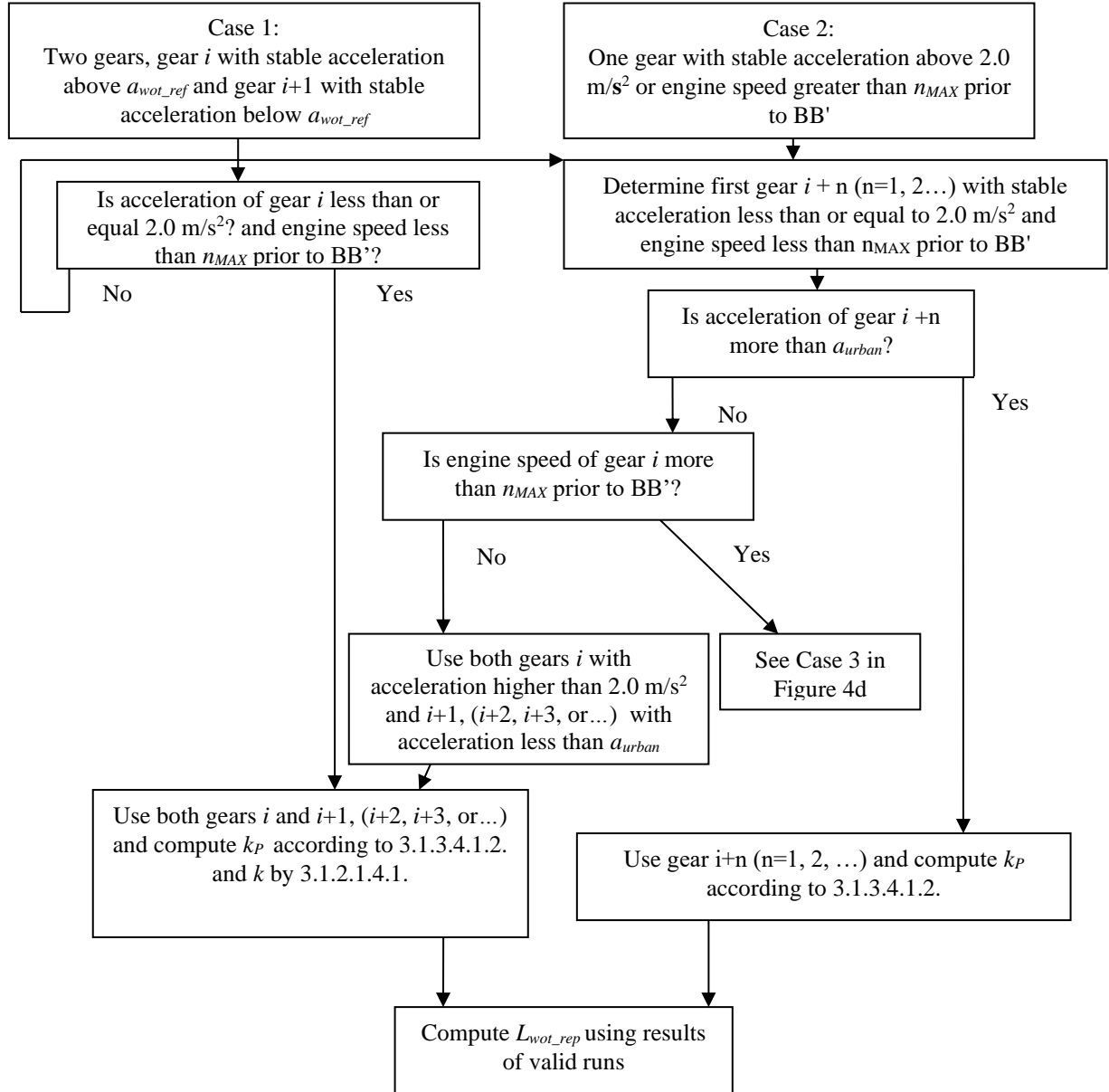


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Figure 4c, amend to read:

"Figure 4c

**Flowchart for vehicles tested according to paragraph 3.1.2.1. of Annex 3 to this Regulation –  
 Gear selection using locked gear PART 2**

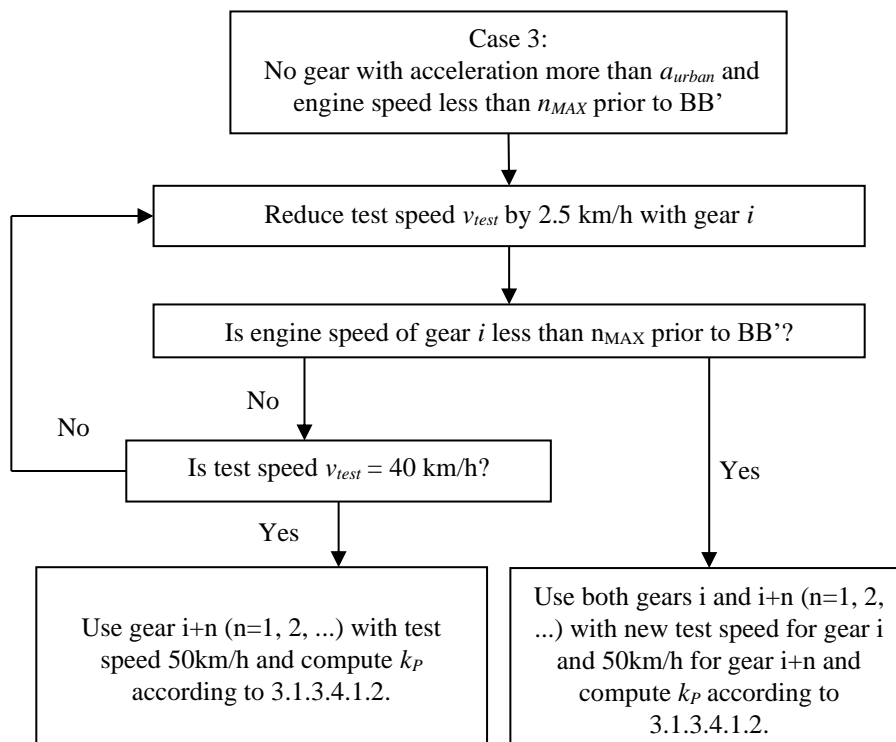


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Figure 4d, amend to read:

"Figure 4d

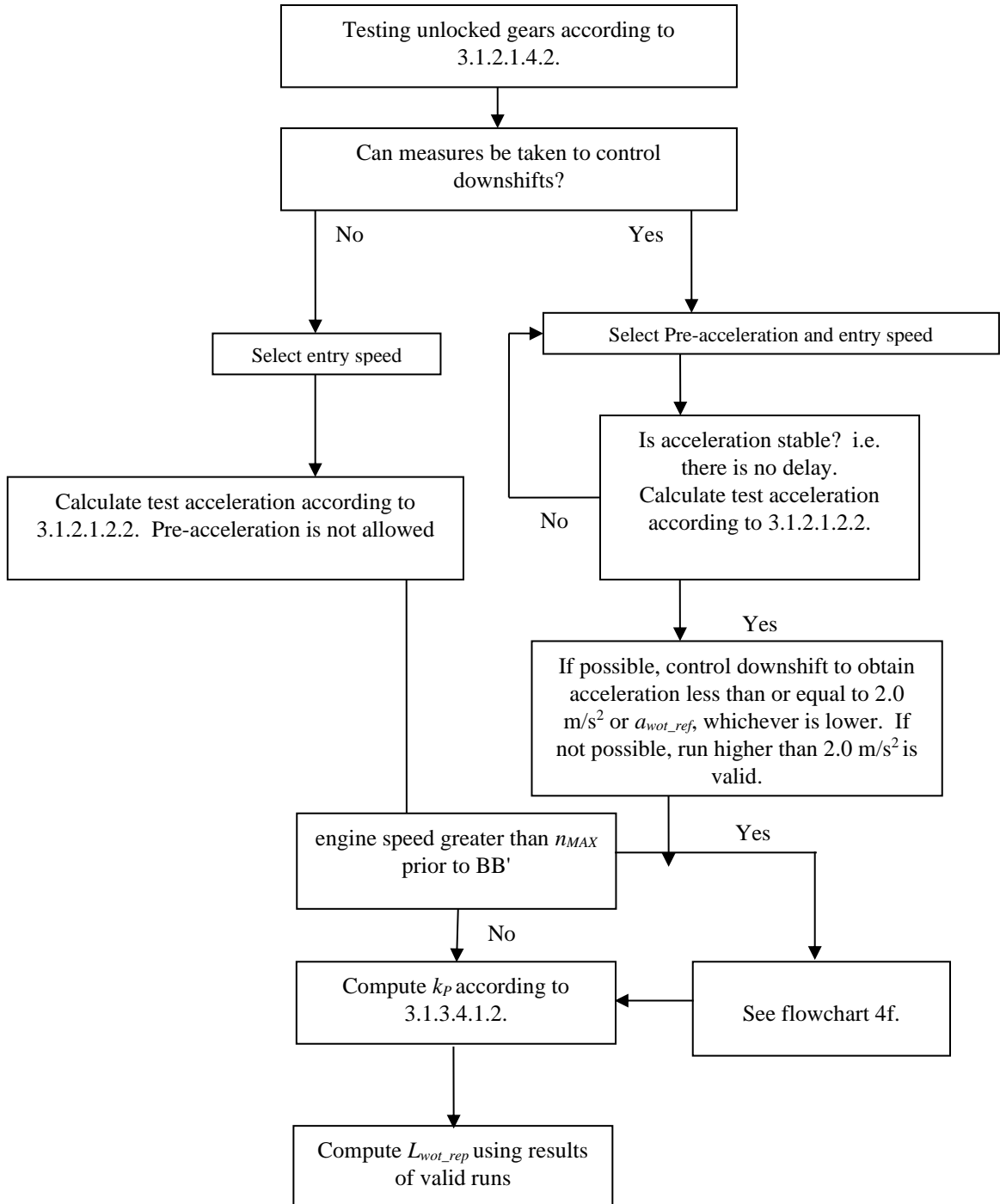
**Flowchart for vehicles tested according to paragraph 3.1.2.1. of Annex 3 to this Regulation –  
Gear selection using locked gear PART 3**



"

Figure 4e, amend to read:  
 "Figure 4e

**Flowchart for vehicles tested according to paragraph 3.1.2.1. of Annex 3 to this Regulation Gear Selection using non-locked gears**

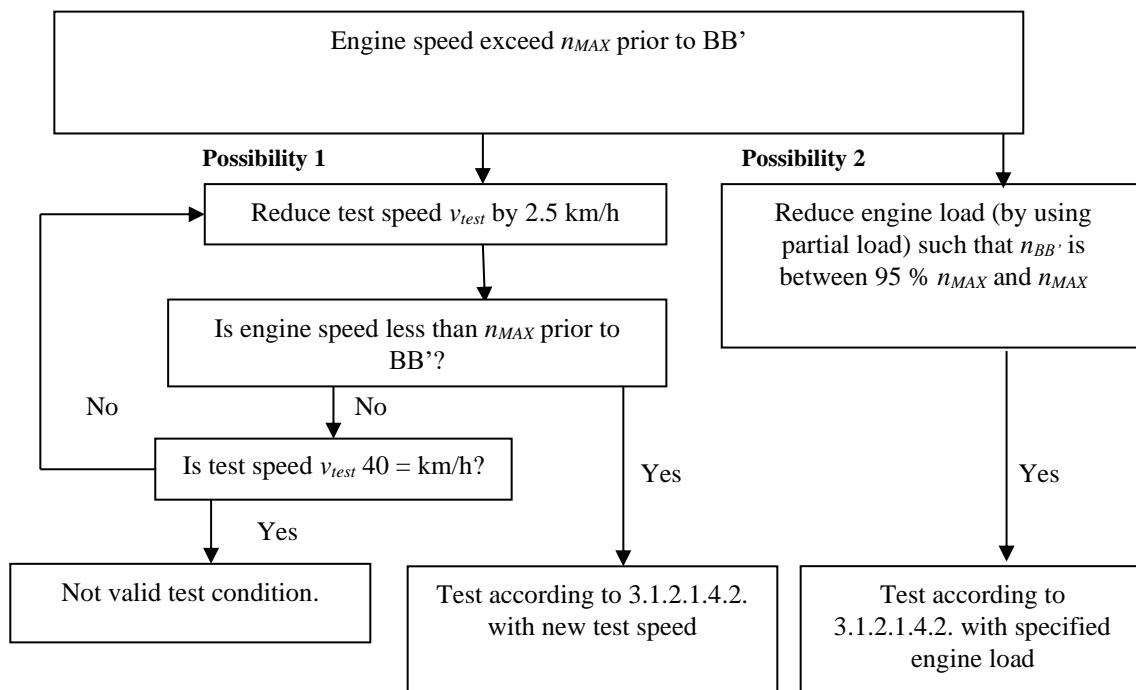


"



Figure 4f, amend to read:  
"Figure 4f

**Flowchart for vehicles tested according to paragraph 3.1.2.1.4.2. of Annex 3 to this Regulation – Gear Selection using non-locked gears**



"

Annex 3, Appendix 2,

Paragraph 2., amend to read:

- "2. General (see the flowcharts in this Appendix 2, Figure 7a to Figure 7c)  
This Appendix provides correction for temperature and test track dependent on the tyre category and purpose.  
For the correction, tyre rolling sound reference values are needed. Tyre rolling sound measurements shall be carried out according to the test procedure of Appendix 3 to Annex 3 of this regulation."

Paragraph 3.3.4., amend to read:

- "3.3.4 For each gear, run and vehicle side extract the power train component  $L_{PT,wot,j}$  from the reported acceleration test  $L_{wot,j}$ , by calculation.  
$$L_{PT,wot,j} = 10 \times \lg(10^{0,1 \times L_{wot,j}} - 10^{0,1 \times L_{TR,wot,j,\theta_{wot}}})$$
  
In case that  $L_{TR,wot,j,\theta_{wot}}$  is greater than  $L_{wot,j}$ :  
(a) the power train component  $L_{PT,wot,j}$  is determined by  
$$L_{PT,wot,j} = 10 \times \lg(0,01 \times 10^{0,1 \times L_{wot,j}})$$
  
(b) the tyre component  $L_{TR,wot,j,\theta_{ref}}$  is determined by  
$$L_{TR,wot,j,\theta_{ref}} = L_{TR,\theta_{ref},v_{TR,ref}} "$$

Annex 3, Appendix 3, paragraph 5.1.4.1., amend to read:

"5.1.4.1. Date of track certification to ISO 10844: 2014/2021\*: ....."

\* Delete what does not apply according to the transitional provisions in this Regulation.

Annex 9, Appendix 4,

Formula 3.2.4.4.2. No.2, amend to read:

$$n_{ACC\_ANCHOR} = (v_{TEST}/20) \times 1000$$

Formula 3.4. No.2, amend to read:

$$L_{PT\_EXP} = \theta_{PT\_HI} \times \lg((n_{BB',TEST} + n_{SHIFT\_PT}) / (n_{BB',CRS\_ANCHOR} + n_{SHIFT\_PT})) + L_{REF\_PT}$$