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**Economic Commission for Europe****Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Lighting and Light-Signalling****Sixty-seventh session**

Geneva, 24–26 January 2018

Item 4 (a) of the provisional agenda

**Regulation No. 51 (Noise of M and N categories of vehicles):****Development****Proposal for Supplement 4 to the 03 series of amendments to Regulation No. 51 (Noise of M and N categories of vehicles)****Submitted by the expert from the International Organization of Motor Vehicle Manufacturers\***

The text reproduced below was prepared by the experts from the International Organization of Motor Vehicle Manufacturers (OICA) to update and revise the 03 series of amendments to Regulation No. 51. The proposed amendments are based on draft Supplement 3 to the 03 series of amendments to Regulation No. 51 which was adopted by the Working Party on Noise at its sixty-sixth session (Annex II to ECE/TRANS/WP.29/GRB/64). The modifications are marked in bold for new or strikethrough for deleted characters.

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\* In accordance with the programme of work of the Inland Transport Committee for 2016–2017 (ECE/TRANS/254, para. 159 and ECE/TRANS/2016/28/Add.1, cluster 3.2), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

## I. Proposal

*Annex 3,*

*Paragraph 3.1.2.1.4.1.,* add a new subparagraph (e):

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

...

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

**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 m/s<sup>2</sup>. Any measure used by manufacturer for above mentioned purposes shall be documented in the test report.”**

*Paragraph 3.1.2.1.4.2.,* amend to read:

“3.1.2.1.4.2. Vehicles with automatic transmission, adaptive transmissions and CVTs tested with non-locked gear ratios:

...

Therefore, it is permitted to establish and use electronic or mechanical devices, including alternate gear selector positions, to prevent a downshift to a gear ratio which is typically not used for the specified test condition in urban traffic.

If possible, the manufacturer shall take measures to avoid an acceleration value  $a_{wot\ test}$  greater than 2.0 m/s<sup>2</sup>.

**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 m/s<sup>2</sup>. Any measure used by manufacturer for above mentioned purposes shall be documented in the test report.**

...”

*Paragraph 3.1.2.1.4.3.,* amend to read:

“3.1.2.1.4.3. Vehicles with only one gear ratio, like but not limited to Battery Electric Vehicles (BEV) and Fuel Cell Vehicles (FCV)

...

If possible, the manufacturer shall take measures to avoid an acceleration value  $a_{wot\ test}$  greater than 2.0 m/s<sup>2</sup>.

**Table 1 in Appendix to Annex 3 provides examples for valid measures to avoid accelerations beyond 2.0 m/s<sup>2</sup>. Any measure used by manufacturer for above mentioned purposes shall be documented in the test report.**

...”

*Paragraph 3.1.2.2.1.2.,* amend to read:

“3.1.2.2.1.2. Automatic transmission, adaptive transmissions, and transmissions with variable gear ratio tested with non-locked gear ratios

The gear selector position for full automatic operation shall be used.

The test may then include a gear change to a lower range and a higher acceleration. A gear change to a higher range and a lower acceleration is not allowed. In any case a gear change to a gear ratio that is typically not used at the specified condition as defined by the manufacturer in urban traffic shall be avoided.

Therefore, it is permitted to establish and use electronic or mechanical devices, including alternative gear selector positions, to prevent a downshift to a gear ratio that is typically not used at the specified test condition as defined by the manufacturer in urban traffic.

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

...”

Appendix to Annex 3, at the end, add a new table 1:

“Table 1. Examples for Devices and Measures to Enable a Vehicle Tested within the Acceleration Boundaries

No.	Impact	Sub No.	Measure	Additional Requirements
1	Lock of a discrete gear ratio	1*	A discrete gear ratio can be locked by the driver	none
		2	A discrete gear ratio is onboard available but is not available to the driver. The locking can be activated by the manufacturer with an onboard (hidden) function or with an external device	none
2	Controlled gear shift management: Applicable to transmissions which cannot be locked, or where no locked gear provides a valid test result	1*	Kickdown is deactivated	none
		2	Gear shift change(s) can happen during the test, gear shift is controlled by activation of an internal function or external device	Acceleration** shall be between $a_{urban}$ and $a_{wot,ref}$ , not exceeding 2.0 m/s <sup>2</sup> .
3	Partial load driving	1	Acceleration is limited by a mechanical device	Acceleration** shall be between $a_{urban}$ and $a_{wot,ref}$ , not exceeding 2.0 m/s <sup>2</sup> . For ASEP**, the anchor point parameter are calculated by:
		2	External Programming for partial load acceleration (***)	$L_{anchor} = (L_{test} - k_p * L_{crs}) / (1 - k_p)$ with $k_p = 1 - a_{test} / a_{wot,ref}$ and $a_{wot,ref}$ according to 3.1.2.1.2.4. but not higher than 2.0 m/s <sup>2</sup> $n_{anchor} = n_{bb,test} * 3.6 / v_{bb,test} * (a_{test} * (20 + 2 * I_{veh}) + 192,9)^{0,5}$

4	Mix Solution (Mode): This measure will be a mix of the above solutions combined in a specific mode	1*	Mode is onboard available and can be selected by the driver	none
		2	Mode is onboard available and can only be activated by the manufacturer with a hidden function or an external device	none
		3	Mode is not onboard available, an external software overrides the internal software	Acceleration** shall be between $a_{urban}$ and $a_{wot,ref}$ , not exceeding 2.0 m/s <sup>2</sup> .

\* Comment: This is a standard situation, already covered by the Regulation text.

\*\* Applicable to vehicles of category M<sub>1</sub>, N<sub>1</sub> and M<sub>2</sub> ≤ 3.500 kg. The calculation under “additional requirements” shall be done for each side of the vehicle separately according to Annex 3, paragraph 3.1.3. The higher final result shall be used for further processing.

\*\*\* Partial load shall be achieved by simulation of the travel restriction of the accelerator. It is not allowed to interfere with the engine control management.”

Annex 7, paragraph 2.5.1., amend to read:

“2.5.1. ...

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 above mentioned purpose shall be documented in the test report.”**

## II. Justification

1. The Regulation specifies at several places that the manufacturer can either use mechanical or electronic devices to control the gear shift, or take measures to avoid accelerations greater than 2.0 m/s<sup>2</sup>.
2. However, those measures are neither defined nor is the manufacturer or technical service obliged to provide documentation in the test report.
3. The proposed amendments introduce a table with examples for devices and measures, with the aim to help the manufacturer and to provide guidance to the technical service. In addition, for these devices and measures the documentation is now mandatory.
4. This will add transparency to the type approval process.