

ASEP IWG Report to GRB 65th

Presentation of ECE/TRANS/WP.29/GRB/2017/2 -
(IWG on ASEP) Proposal for Supplement 2 to the 03
series of amendments to Regulation
and GRB-65-26

Justifications

1. In order to propose a testing procedure, which is more consistent and clearly defined, the following technical modifications and extensions were introduced.
2. To facilitate reading and understanding, the text was re-structured.
3. In order to avoid misunderstanding and confusion which may induce different interpretations of application, the text was clarified.

Additional clarification were introduced in GRB-65 in order to avoid confusion or to give clearer specifications

(ex. transmission conditions, tests on different test tracks or under different environmental conditions, invalid gear

Justifications

Lot of inconsistency were highlight on symbols and acronyms for annex 7 and Annex 3.

→ IWG ASEP tries to correct them without interfere with Annex 3.

→ IWG recommends to GRB to fully review UN51.03 to make symbols and acronyms more consistent.

Technical modifications and extensions

1.1

1.1. New definitions for Annex 7, which are also applicable for Annex 3:

- (a) Definitions for gear, gear ratio, gear_i and gear_{i+1} were added for clarity;
- (b) The missing definition for mode was added and taken over from the first part of Global Technical Regulation No. 15;
- (c) Definitions for "Stable" and "Unstable" accelerations were introduced to avoid ambiguity.

Technical modifications and extensions

1.1 + GRB-65-xx

1.1. New definitions for Annex 7, which are also applicable for Annex 3:

- (a) Definitions for gear, gear ratio, gear_i and gear_{i+1} were added for clarity;

→ Text was modified to be more consistent with annex 1 and 3.

"2.18. Gear¹

2.18.1. "Gear ratios"

2.18.1.1. "Internal Gearbox ratio" means the ratios of engine to gearbox output shaft revolutions.

2.18.1.2. "Final drive ratio" means the ratio(s) of gearbox output shaft to driven wheel revolutions.

2.18.1.3. "Total gear ratio" means the in the context of this Regulation any ratios between vehicle speed and engine speed during the passage of the vehicle through the test track. Used is the gear ratio at the point in the test track, when the rear of the vehicle passes line BB².

2.18.1.4. "Gear ratio" used in context with vehicles tested according to 3.1.2.1 of Annex 3 and Annex 7 is the total gear ratio as defined in 2.18.1.3. above.

2.18.2. "Locked gear ratios" means the control of the transmission such that the transmission gear ~~cannot~~ will not change during a test.

2.18.3. "Gear" means in the context of this Regulation a discrete gear ratio either selectable by the driver or by an external device.

2.18.4. For vehicles tested according 3.1.2.1 of Annex 3 and Annex 7, "Gear_igear_{i+1}" and "gear_{i+1}" are defined as two gears in sequence, where gear_i either provides an acceleration within the 5% tolerance according to paragraph 3.1.2.1.4.1. (a) of Annex 3 or an acceleration greater than the reference acceleration, and gear_{i+1} an acceleration lower than the reference acceleration according to paragraph 3.1.2.1.4.1. (b) or (c) of Annex 3.

~~When the acceleration meets the 5% tolerance of the reference acceleration, this gear is defined as well as "gear_i".~~

Technical modifications and extensions

1.1 + GRB-65-xx

1.1. New definitions for Annex 7, which are also applicable for Annex 3:

- (c) Definitions for "Stable" and "Unstable" accelerations were introduced to avoid ambiguity.

→ Text was modified to propose a clear specification.

"2.26. Stable acceleration

2.26.1. "*Stable acceleration*" applicable when acceleration needs to be calculated is given when the acceleration ratio between $a_{\text{wof_testPP-BB}}$ and $a_{\text{wof_test}}$ is less than or equal to 1.2. from line AA' to PP' has a low variation to the acceleration from line PP' to BB'.

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."

→ Modification Annex 7 §2.4

For P₁, if a stable acceleration condition cannot be achieved according to 2.26.2.1. in the definition section of this Regulation, the speed $v_{AA,kl}$ 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 2.26.1. the acceleration $a_{\text{wof_testPP-BB}}$ shall be calculated according the formula given in paragraph 3.1.2.1.2 of Annex 3.

Technical modifications and extensions

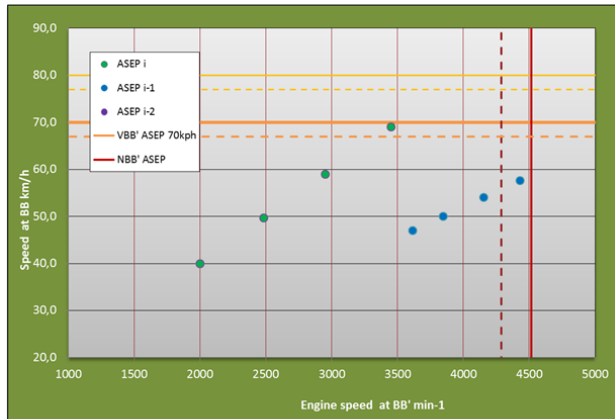
1.2

1.2. The ambiguous principle of target speed 70 or 80 km/h was replaced by:

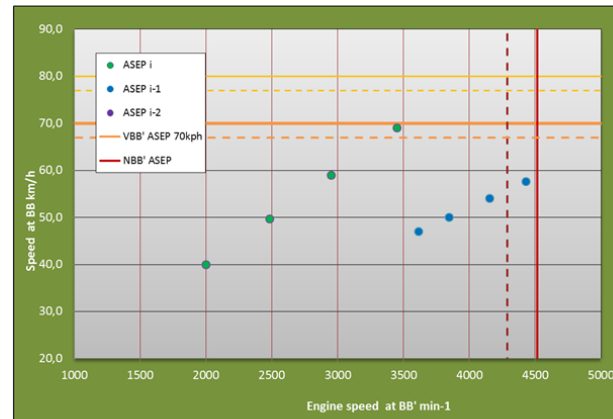
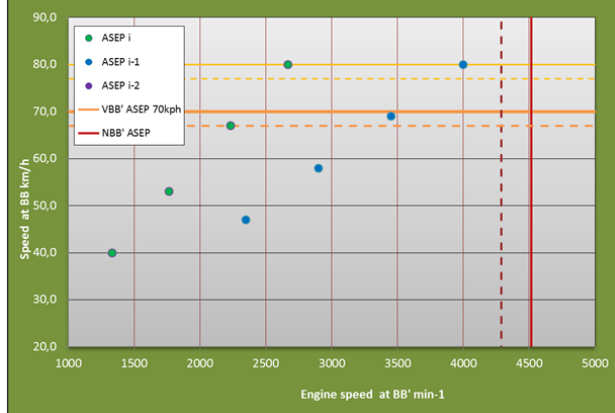
- (a) 80 km/h target speed (depending on n_{BB_ASEP}) for locked transmission for the lowest valid gear and non-locked transmission, to make sure that, at the lowest gear, the vehicle is tested closest to the requested maximum engine speed;
- (b) 70 km/h target speed was considered for all gears other than the lowest, as none of the higher gears can provide the maximum engine speeds higher than those achieved in the lowest gear.

Technical modifications and extensions

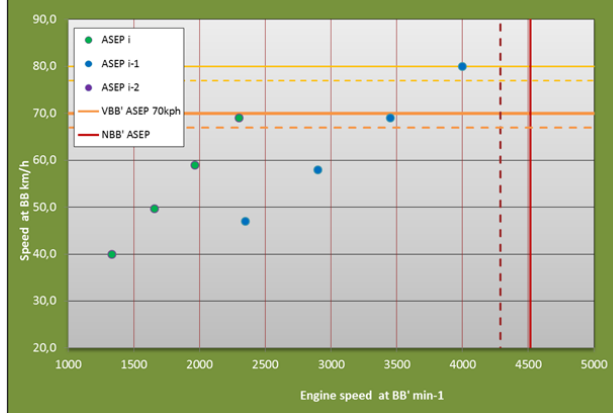
1.2



UN51.03



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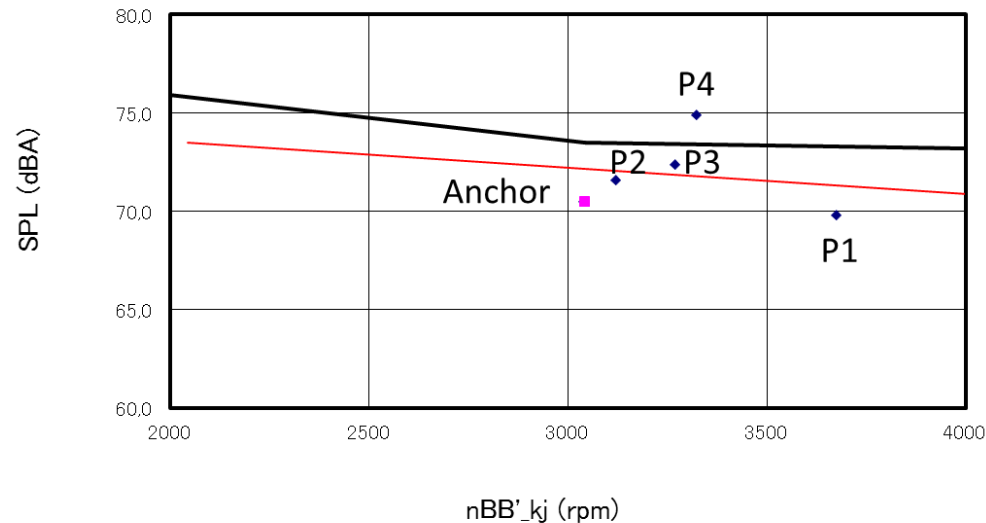
Same Speed
and engine
speed range

Reduced
speed range
(until
10km/h)
Same engine
range

Technical modifications and extensions

1.4

1.4. For the slope assessment, the "slope_k < 0 on non-locked automatic transmission, the selected transmission setup not valid" was enhanced by the provision that, in this case, the L_{urban} - assessment shall be used. Otherwise, it would not be clear what should happen in this situation.



Technical modifications and extensions

1.6

1.6. In order to uniform the limit concept extra margin (limit value - L_{urban} of Annex 3) for "silent vehicle" defined in the slope assessment method for vehicles with locked transmission, this concept was also applied to vehicles with non-locked transmission and for the L_{urban} - assessment.

Technical modifications and extensions

1.6

- For locked modes :
 - Slope assessment method :
$$x = 2 \text{ dB(A)} + \text{limit value} - L_{\text{urban}}$$

→ Bonus
 - L urban assesment method :
$$L_{\text{urban_ASEP}} (a \text{ asep}, L \text{ urb}, L \text{ crs}, L \text{ asep}) \leq 3.0 \text{ dB(A)}$$

→ No bonus

Technical modifications and extensions

1.6

- For Slope assessment method :
 - For non-locked modes :
 $x = 3 \text{ dB(A)}$
→ No bonus
 - For locked modes :
 $x = 2 \text{ dB(A)} + \text{limit value} - \text{Lurban}$
→ Bonus

Technical modifications and extensions

1.7

1.7. In order to be technology neutral and to respect the rapid changes in technology towards high gear number transmissions, an additional condition to determine the gear to be tested was introduced for reference sound assessment for automatic transmission tested in locked position with 6 or more gears. An acceleration of 1.9 m/s^2 was defined from 50 km/h at AA to 61 km/h at BB + 5 m length vehicle to reflect the typical type approval condition under the 02 series of amendments to Regulation No. 51.

Technical modifications and extensions

1.8

1.8. The missing limits from the 02 series of amendments to Regulation No. 51 in the reference sound assessment were introduced:

- (a) For N_1 vehicles, the limits of the 02 series of amendments to Regulation No. 51 were overtaken and +2 dB(A) added, using the same principle already defined in the reference sound assessment for vehicles of category M_1 : for a category/sub-category, limit reference assessment equal to limit in the 02 series of amendments to Regulation No. 51 + 2 dB(A);
- (b) The tolerances of the 02 series of amendments to Regulation No. 51 for direct injection diesel and off-road vehicles.

Technical modifications and extensions

1.9. The part on " L_{urban} - assessment" was moved before the reference sound assessment, to have the right order of assessment.

1.10. The conditions for direct measurement and simulation were separated and precised.

1.11. Speed normalization ($0.15 * (V_{\text{BB_ASEP}} - 50)$) was moved from $L_{\text{urban_ASEP}}$ to $L_{\text{urban_normalized}}$ and $L_{\text{urban_ASEP}}$ was renamed $\Delta L_{\text{urban_ASEP}}$.

1.12. Flowcharts were introduced.