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Item 2 of the provisional agenda

UN Regulation No. 41 (Noise emissions of motorcycles)**Proposal for a new 05 series of amendments to UN
Regulation No. 41****Submitted by the experts from the Informal Working Group on
Additional Sound Emission Provisions***

The text reproduced below was prepared by the experts from the Informal Working Group on Additional Sound Emission Provisions (IWG ASEP) in order to strengthen the ASEP testing conditions for motorcycles. It is based upon UN Regulation No. 41 up to Supplement 7. The modifications to the Regulation are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2020 as outlined in proposed programme budget for 2020 (A/74/6 (part V sect. 20) para 20.37), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



I. Proposal

Paragraph 1., amend to read:

"1. Scope

This Regulation applies to vehicles of category L₃¹ with regard to noise.

The specifications in this Regulation are intended to reproduce the sound levels which are generated by vehicles during normal driving in urban traffic.

This Regulation provides, as well, Real Driving Additional Sound Emission Provisions (RD-ASEP) for vehicles of category L₃ referring to typical on road driving conditions including high accelerations and engine loads for urban and suburban traffic, except for highways situations."

Paragraph 2.13., amend to read:

"2.13. Following is a table containing all symbols used in this Regulation:

<i>Symbol</i>	<i>Units</i>	<i>Explanation</i>	<i>Reference</i>
AA'	–	virtual line on the test track	Annex 4 – Figure 1
a _{wot}	m/s ²	calculated acceleration	Annex 3 – 1.4.2.
a _{wot,ref}	m/s ²	prescribed reference acceleration	Annex 3 – 1.3.3.3.1.2.
a _{urban}	m/s ²	prescribed target acceleration	Annex 3 – 1.3.3.3.1.2.
BB'	–	virtual line on the test track	Annex 4 – Figure 1
CC'	–	virtual line on the test track	Annex 4 – Figure 1
K	–	gear weighting factor	Annex 3 – 1.4.3.
k _p	–	partial power factor	Annex 3 – 1.4.4.
L	dB(A)	sound pressure level	Annex 3 – 1.4.1.
L _{wot(i)}	dB(A)	L at wot condition	Annex 3 – 1.4.6.
L_{ASEP}	dB(A)	L at RD-ASEP additional operating conditions	Annex 7 – 3.3.3.2.
l _{PA}	m	pre-acceleration length	Annex 3 – 1.3.3.1.1.
m _{kerb}	kg	kerb mass of the vehicle	2.6.
m _t	kg	test mass of the vehicle	Annex 3 – 1.3.2.2.
n	min ⁻¹	engine speed	
n _{PP'}	min ⁻¹	engine speed at PP'	Annex 7 – 2.6.
n _{idle}	min ⁻¹	engine speed at idle	–
n _{wot(i)}	min ⁻¹	n _{PP'} measured at L _{wot(i)} detection	Annex 7 – 2.6.
PP'	–	virtual line on the test track	Annex 4 – Figure 1
PMR	–	power-to-mass ratio index	2.9.
P _n	kW	rated maximum net power	2.7.

¹ As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3) (ECE/TRANS/WP.29/78/Rev.6).

<i>Symbol</i>	<i>Units</i>	<i>Explanation</i>	<i>Reference</i>
S	min ⁻¹	rated engine speed	2.8.
V	km/h	measured vehicle speed	–
V _{max}	km/h	maximum speed	2.10.
V _{test}	km/h	prescribed test speed	Annex 3 – 1.3.3.1.1.

The following indices are used for engine speeds "n" and vehicle speeds "v" to indicate the location or rather time of the measurement:

- (a) AA' denoting that the measurement corresponds to the point in time when the front of the vehicle passes the line AA' (see Annex 4 – Figure 1); or
- (b) PP' denoting that the measurement corresponds to the point in time when the front of the vehicle passes the line PP' (see Annex 4 – Figure 1); or
- (c) BB' denoting that the measurement corresponds to the point in time when the rear of the vehicle passes the line BB' (see Annex 4 – Figure 1).

The following indices are used for calculated full throttle accelerations a_{wot} and measured sound pressure levels L to indicate the gear used for the test:

- (a) "(i)" denoting, in the case of a two-gear test, the lower gear (i.e. the gear with the higher gear transmission ratio) and otherwise referring to the single test gear or gear selector position used; or
- (b) "(i + 1)" denoting, in the case of a two-gear test, the higher gear (i.e. the gear with the lower gear transmission ratio).

Measured sound pressure levels L also carry an index indicating the type of the respective test:

- (a) "Wot" denoting a full throttle acceleration test (see paragraph 1.3.3.1.1. of Annex 3); or
- (b) "CRS" denoting a constant speed test (see paragraph 1.3.3.3.2. of Annex 3); or
- (c) "Urban" denoting a weighted combination of a constant speed test and a full throttle acceleration test (see paragraph 1.4.6.2. of Annex 3).

The index "j" referring to the number of the test run can be used in addition to the indices mentioned above."

Paragraph 3.5., amend to read:

"3.5. A test report from the Technical Service conducting the type approval test shall be submitted to the Type Approval Authority. This test report shall at least include the following information:

- (a) Details of the test site (e.g. surface temperature, absorption coefficient, etc.), test site location, site orientation and weather conditions including wind speed and air temperature, direction, barometric pressure, humidity;
- (b) The type of measuring equipment including the windscreen;
- (c) The A-weighted sound pressure level typical of the background noise;
- (d) The identification of the vehicle, its engine, its transmission system, including available transmission ratios, size and type of tyres, tyre pressure, type approval number of the tyres (if available) or tyre manufacturer and commercial description of the tyres (i.e. trade name,

speed index, load index), rated maximum net power, test mass, power to mass ratio index, $a_{wot\ ref}$, a_{urban} , vehicle length;

- (e) The transmission gears or gear ratios used during the test;
- (f) **For tests according to Annex 3 of this Regulation and for the reference points tests of Annex 7 paragraph 3.2. ~~the~~ the vehicle speed and engine speed at the beginning of the period of acceleration and the location of the beginning of the acceleration per gear used;**
- (g) **For tests according to Annex 3 of this Regulation and according to the reference points test of Annex 7 paragraph 3.2. ~~the~~ the vehicle speed and engine speed at PP' and at the end of the acceleration per valid measurement;**
- (h) **For tests according to Annex 7, paragraph 3.3. the vehicle speed and the engine speed at lines AA', PP' and BB';**
- (i) **For tests according to Annex 7, paragraph 3.3. the approach condition to line AA' (acceleration, deceleration or constant speed) and the prescribed throttle control position (in % of throttle control opening) between lines AA' and BB';**

Note: **This is a description of the prescribed throttle control operation. The actual throttle control operation during a test run will not be recorded but assessed by observation only;**

- ~~(h)~~(j) The method used for calculation of the acceleration;
- ~~(i)~~(k) The intermediate measurement results $a_{wot(i)}$, $a_{wot(i+1)}$, $L_{wot(i)}$, $L_{wot(i+1)}$, $L_{crs(i)}$ and $L_{crs(i+1)}$, if applicable;
- ~~(j)~~(l) The weighting factors k and k_p and the final measurement results L_{wot} , L_{crs} , ~~and~~ L_{urban} **and** L_{ASEP} ;
- ~~(k)~~(m) The auxiliary equipment of the vehicle, where appropriate, and its operating conditions;
- ~~(l)~~(n) All valid A-weighted sound pressure level values measured for each test, listed according to the side of the vehicle and the direction of the vehicle movement on the test site; and
- ~~(m)~~(o) All relevant information necessary to obtain the different sound emission levels."

Paragraph 6.3.2., amend to read:

"6.3.2. The vehicle type to be approved shall meet the requirements of Annex 7 to this Regulation. If the motor cycle has user selectable software programs or modes which affect the sound emission of the vehicle, all these modes shall be in compliance with the requirements in Annex 7. ~~Testing shall be based on the worst case scenario.~~"

Paragraph 8.3., amend to read:

"8.3. For conformity of production, the manufacturer shall make a renewed declaration that the type still fulfils the requirements of paragraph 6.3.1. of this Regulation. The measured sound levels according to Annex 7 shall not exceed by more than 1.0 dB(A) the limits given in paragraph 2.6. of Annex 7. **As a minimum, tests in the operating conditions for the reference points according to paragraph 3.2. of Annex 7 shall be performed.**"

Paragraph 12., amend to read:

"12.1. **As from the official date of entry into force of the 05 series of amendments, no Contracting Party applying this Regulation shall refuse to grant or refuse to accept type approvals under this Regulation as amended by the 05 series of amendments.**

- 12.2. As from 1 September [2024], Contracting Parties applying this Regulation shall not be obliged to accept type approvals to the preceding series of amendments, first issued after 1 September [2024].
- 12.3. Until 1 September [2025], Contracting Parties applying this Regulation shall accept type approvals to the preceding series of amendments, first issued before 1 September [2024].
- 12.4. As from 1 September [2025], Contracting Parties applying this Regulation shall not be obliged to accept type approvals issued to the preceding series of amendments to this Regulation.
- 12.5. Notwithstanding the transitional provisions above, Contracting Parties who start to apply this Regulation after the date of entry into force of the most recent series of amendments are not obliged to accept type approvals which were granted in accordance with any of the preceding series of amendments to this Regulation / are only obliged to accept type approval granted in accordance with the 05 series of amendments.
- 12.6. Notwithstanding paragraph 12.4., Contracting Parties applying this Regulation shall continue to accept type approvals issued according to the preceding series of amendments to this Regulation, for the vehicles/vehicle systems which are not affected by the changes introduced by the 05 series of amendments.
- 12.7. Contracting Parties applying this Regulation shall not refuse to grant type approvals according to any preceding series of amendments to this Regulation or extensions thereof. However, the road surface covering of the test site may conform to ISO10844:2014 when granting type approval according to the 03 series of amendments to this Regulation or extensions thereof."

Annex 1,

Item 18, amend to read:

18. Additional sound emission provisions:

18.1.	<i>RD-ASEP operating conditions</i>	<i>Reference Point (i)</i>	<i>Reference Point (ii)</i>	<i>additional operating condition 1</i>	<i>additional operating condition 2</i>	<i>additional operating condition 3</i>
18.1.1.	Selected gear number					
18.1.2.	Vehicle speeds	-	-	-	-	-
18.1.2.1.	Vehicle speed at the beginning of the period of acceleration (average of 3 runs) (km/h)			n.a.	n.a.	n.a.
18.1.2.2.	Pre-acceleration length (m)			n.a.	n.a.	n.a.
18.1.2.3.	Vehicle speed vAA' (average of 3 runs for Reference Point (i) and (ii)) (km/h)					
18.1.2.4.	Vehicle speed vPP' (average of 3 runs for Reference Points (i) and (ii)) (km/h)					
18.1.2.5.	Vehicle speed vBB' (average of 3 runs for Reference Points (i) and (ii)) (km/h)					
18.1.3.	Engine speeds	-	-	-	-	-
18.1.3.1.	Engine speed nAA' (average of 3 runs for Reference Points (i) and (ii)) (min ⁻¹)					

18.1.	<i>RD-ASEP operating conditions</i>	Reference Point (i)	Reference Point (ii)	additional operating condition 1	additional operating condition 2	additional operating condition 3
18.1.3.2.	Engine speed nPP' (average of 3 runs for Reference Points (i) and (ii)) (min ⁻¹)					
18.1.3.3.	Engine speed nBB' (average of 3 runs for Reference Points (i) and (ii)) (min ⁻¹)					
18.1.4.	Wide open throttle test result Lwot for Reference Points (i) and (ii) (dB(A))			n.a.	n.a.	n.a.
18.1.5.	max. sound pressure level L_{ASEP} of the additional operating conditions	n.a.	n.a.			
18.1.5.6.	RD-ASEP limit					

Item 19, amend to read:

"...

19.5. User selectable software programs or modes with effect on either L_{wot(i)} or L_{crs} or L_{urb} or L_{ASEP}

19.5.1. List of user selectable software programs or modes:

19.5.2. User selectable software programs or modes used for the L_{urb} determination according to Annex 3:.....

19.5.3. User selectable software programs or modes used for L_{wot} and L_{ASEP} determination according to Annex 7:....."

Annex 3,

Paragraph 1.3.3.1., amend to read:

"1.3.3.1. General operating conditions

The path of the centreline of the vehicle shall follow the 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' +20m (see Annex 4 – Figure 1).

1.3.3.1.1. For full throttle acceleration tests the vehicle shall approach the line AA' at constant speed. When the front of the vehicle passes the line AA' the throttle control shall be shifted to the maximum throttle position as rapidly as possible and kept in this position until the rear of the vehicle passes the BB'. At this moment the throttle control shall be shifted to the idle position as rapidly as possible.

Unless specified otherwise the manufacturer may choose to use pre-acceleration in a full throttle acceleration test for the purpose of achieving a stable acceleration between the lines AA' and BB'. A test with pre-acceleration proceeds as described above except for the fact that the throttle control is shifted to the maximum throttle position already before the vehicle passes the line AA', namely when the front of the vehicle is still at a distance l_{PA}, the pre-acceleration length, from the line AA'.

The approach velocity shall be chosen such that the vehicle reaches a prescribed test speed v_{test} when its front passes the line PP'.

Paragraph 1.4.1., amend to read:

"1.4.1. General

At least three measurements for each test condition shall be made on each side of the vehicle and for each gear.

The maximum A-weighted sound pressure level "L" indicated during each passage of the vehicle between AA' and **when the rear of the vehicle passes**

BB' +20m (see Annex 4 – Figure 1) shall be reduced by 1 dB(A) to account for measurement inaccuracy and mathematically rounded to the nearest first decimal place (e.g. XX.X) for both microphone positions. If a sound peak obviously out of character with the general sound pressure level is observed, that measurement shall be discarded.

The first three valid consecutive measurement results for each test condition, within 2.0 dB(A), allowing for the deletion of non-valid results, shall be used for the calculation of the appropriate intermediate or final result.

The speed measurements at AA' ($v_{AA'}$), BB' ($v_{BB'}$), and PP' ($v_{PP'}$) shall be mathematically rounded to the nearest first decimal place (e.g. XX.X) and noted for further calculations."

Annex 7, amend to read:

"Real Driving Additional Sound Emission Provisions (RD-ASEP)

1. Scope
 - 1.1. This annex applies to vehicles of category L3 with PMR >50.
 - ~~1.2. Vehicles with variable gear ratios or automatic transmission with non lockable gear ratios are exempted from the requirements of this annex, if the vehicle manufacturer provides technical documents to the type approval authority showing, that the vehicle's engine speed at BB' does neither exceed $n_{BB'} + 0.05 * (S - n_{idle})$ nor fall below $n_{BB'} - 0.05 * (S - n_{idle})$ for any test condition inside the ASEP control range defined in paragraph 2.5. below, where $n_{BB'}$ is the average engine speed at BB' from the three valid acceleration tests according to paragraph 1. of Annex 3.~~
2. Additional sound emission requirements
 - 2.1. Measuring instruments

The requirements for the measurement equipment are identical to those defined in paragraph 1.1. of Annex 3 for the tests of the motor cycle in motion.
 - 2.2. Acoustical environment, meteorological conditions and background noise

The requirements concerning the acoustical environment, the meteorological conditions and the background noise are identical to those defined in paragraph 1.2. of Annex 3 for the tests of the motor cycle in motion.
 - 2.3. Microphone positions and conditions of the vehicle

The requirements concerning the microphone positions and the conditions of the vehicle are identical to those defined in paragraphs 1.3.1. and 1.3.2. of Annex 3 for the tests of the motor cycle in motion.
 - 2.4. General operating conditions

The general operating conditions are identical to those defined in paragraph 1.3.3.1. of Annex 3 for the tests of the motor cycle in motion.
 - 2.5. **RD-ASEP control range**

The requirements of this annex apply to any vehicle operation with the following restrictions:

 - (a) $v_{AA'}$ shall be at least ~~2~~**10** km/h
 - (b) $v_{BB'}$ shall not exceed 80 km/h **for vehicles with PMR≤150**
 $v_{BB'}$ shall not exceed 100 km/h for vehicles with PMR>150
 - (c) $n_{AA'}$ shall be at least $0.1 * (S - n_{idle}) + n_{idle}$
 - (d) $n_{BB'}$ shall not exceed

$$\frac{0.85 * (S - n_{idle}) + n_{idle}}{0.8 * S} \text{ for } PMR \leq 66 \text{ and}$$

$$\frac{3.4 * PMR^{-0.33} * (S - n_{idle}) + n_{idle}}{0.8 * S} \text{ for } PMR > 66$$

Note: If the vehicle has more than one gear, the first gear shall not be used.

The values for the RD-ASEP control range shall be seen as absolute values and shall not be increased or lowered by addition or subtraction of the tolerance for v_{test} as indicated in paragraph 3.3.1.

2.6. RD-ASEP limits¹

The maximum noise level recorded during the passage of the motorcycle through the test track shall not exceed:

$$L_{wot,(i)} + (1 * (n_{PP'} - n_{wot,(i)}) / 1,000) + 3 \quad \text{for } n_{PP'} < n_{wot,(i)} \text{ and}$$

$$L_{wot,(i)} + (5 * (n_{PP'} - n_{wot,(i)}) / 1,000) + 3 \quad \text{for } n_{PP'} \geq n_{wot,(i)}$$

Where $L_{wot,(i)}$ and $n_{PP'}$ have the same meaning as in paragraph 1. of Annex 3 and $n_{wot,(i)}$ refers to the corresponding engine speed when the front of the vehicle passes the line PP'.

If the tests according to Annex 3 of this UN Regulation and the RD-ASEP tests are performed with the same vehicle in immediate sequence, the values for $L_{wot(i)}$ and $n_{wot(i)}$ from the Annex 3 test may be used, if agreed by the type approval authority. Otherwise, when compliance with these limits is checked, values for $L_{wot(i)}$ and $n_{wot(i)}$ shall be newly determined by measurements as defined in paragraph 1. of Annex 3, however using the same gear (i) and the same pre-acceleration distance as during type approval.

2.7. Facilities

Due to limitations of test facilities and in respect of safety, not every test condition may be safely performed on every test facility.

Notwithstanding such restrictions, the type approval shall be granted on these test facilities, however the vehicle has to comply to all provisions of this Annex 7. In these cases, the vehicle manufacturer shall explain to the satisfaction of the authority present at type approval that the vehicle fulfils the requirements which could not be tested due to the restriction of the test facility.

3. Testing compliance by measurements²

3.1. General

The Type Approval Authority as well as the technical service shall request tests to check the compliance of the motorcycle with the requirements of paragraph 2. above. To avoid undue work load, testing is restricted to the reference points defined in paragraph 3.2. below and ~~two~~ **three** additional operating conditions ~~other than the reference points but inside the ASEP control range. as defined in paragraph 3.3. of this Annex per gear. The total number of operating conditions to be tested according to paragraph 3.3. of this Annex shall be reduced by the operating conditions which were applied for tests according to paragraph 3.2. of this Annex and for the determination of L_{urb} according to Annex 3.~~

For vehicles with variable gear ratios or automatic transmission with non-lockable gear ratios testing shall be limited to 6 operating conditions as defined in paragraph 3.3. of this Annex, and different from the operating

² It is recommended that the rider who is performing the tests is making himself familiar with the riding characteristics of the test vehicle before he performs the test runs.

conditions which were applied for the determination of L_{urb} according to Annex 3.

3.2. **RD-ASEP reference test conditions**

3.2.1. Test procedure

When the front of the vehicle reaches AA', the throttle shall be fully engaged and held fully engaged until the rear of the vehicle reaches BB'. The throttle shall then be returned as quickly as possible to the idle position. Pre-acceleration may be used if acceleration is delayed beyond AA'. The location of the start of the acceleration shall be reported.

3.2.2. Test speed and gear selection

The vehicle shall be tested at each of the following operating conditions:

- (i) $v_{PP'} = 50$ km/h

The selected gear (i) and pre-acceleration condition shall be the same as those used in the original type approval test of Annex 3 of this Regulation.

- (ii) $v_{BB'}$ corresponding to

$$n_{BB'} = 0.85 * (S - n_{idle}) + n_{idle} \text{ for } PMR \leq 66; \text{ and}$$

$$n_{BB'} = 3.4 * PMR^{-0.33} * (S - n_{idle}) + n_{idle} \text{ for } PMR > 66$$

0.8 x S

$v_{BB'}$ shall not exceed ~~80 km/h~~ **the values as specified in paragraph 2.5 (b) of this Annex.**

The selected gear shall be 2nd. If the 3rd gear satisfies requirements of $n_{BB'}$ and $v_{BB'}$, 3rd shall be used. If the 4th gear satisfies requirements of $n_{BB'}$ and $v_{BB'}$, 4th shall be used. **If the 5th gear satisfies requirements of $n_{BB'}$ and $v_{BB'}$, 5th shall be used. If the 6th gear satisfies requirements of $n_{BB'}$ and $v_{BB'}$, 6th shall be used.**

If in 2nd gear under the above-mentioned condition for $n_{BB'}$ the vehicle speed at line BB' would exceed the value for $v_{BB'}$ as specified in paragraph 2.5. of this Annex, the test shall be performed in 2nd gear and a maximum vehicle speed as specified in paragraph 2.5. of this Annex shall be reached at line BB' instead.

If during the test unusual riding conditions (such as apparent wheel spin or front wheel lift up) occur, the test shall be performed in the next higher gear, and the maximum vehicle speed as specified in paragraph 2.5. of this Annex shall be reached at line BB' instead.

3.2.3. Data processing and reporting

The requirements of paragraph 1.4. of Annex 3 shall be applied.

In addition the engine speed values at AA', BB', and PP' in units of min^{-1} shall be mathematically rounded to the nearest integer for further calculations. For a given test condition the three individual engine speeds shall be averaged arithmetically.

The final sound pressure levels for the full throttle acceleration shall not exceed the limits specified in paragraph 2.6. above.

3.3. **Additional operating conditions**

3.3.1. **Test procedure**

The vehicle shall approach the line AA' at constant speed or in acceleration or deceleration, according to the throttle operation which may be requested by the technical service responsible for conducting approval tests in agreement with the type approval authorities.

The approach velocity shall be chosen as such that the vehicle reaches a prescribed test speed $v_{\text{test}} \pm 5$ km/h when its front passes the line AA'.

[Examples:

requested $v_{\text{test}}=10\text{km/h} \rightarrow$ valid $v_{\text{AA}'}=10\text{-}15\text{km/h}$

requested $v_{\text{test}}=15\text{km/h} \rightarrow$ valid $v_{\text{AA}'}=10\text{-}20\text{km/h}$

requested $v_{\text{test}}=75\text{km/h} \rightarrow$ valid $v_{\text{AA}'}=70\text{-}80\text{km/h}$

requested $v_{\text{test}}=95\text{km/h} \rightarrow$ valid $v_{\text{AA}'}=90\text{-}100\text{km/h}$

requested $v_{\text{test}}=100\text{km/h} \rightarrow$ valid $v_{\text{AA}'}=95\text{-}100\text{km/h}$]

When the front of the vehicle passes the line AA' the throttle control shall be adjusted as rapidly as possible to a position (partial throttle, wide open throttle or maintain present throttle control position) which may be defined by the technical service responsible for conducting approval tests in agreement with the type approval authorities and shall be kept in this position until the rear of the vehicle passes line BB'.

When the rear of the vehicle passes line BB' the throttle control shall be shifted to the idle position as rapidly as possible.

The throttle position between lines AA' and BB' shall not result in a deceleration of the vehicle.

3.3.2. Test speed, gear and mode selection and throttle operation

The conditions of this paragraph may be defined by the technical service responsible for conducting the approval tests in agreement with the type approval authorities.

The test speed v_{test} may be any speed within the RD-ASEP control range as defined in paragraph 2.5. of this Annex.

The vehicle may be tested in any of the available gears, including 1st gear.

The vehicle may be tested in any of the available user selectable software programs or modes which affect the sound emissions of the vehicle.

The throttle operation shall be in accordance with paragraph 3.3.1. of this Annex.

The throttle operation before line AA' and between lines AA' and BB' shall be defined and described in a way that it can be performed by a skilled rider who has made himself familiar with the riding characteristics of the test vehicle and that the correct execution can be assessed by observation without the necessity of technical equipment on the vehicle or at the test site other than the equipment which is required for the tests according to Annex 3.

If the requested operating conditions lead to an unusual vehicle behaviour (i.e. front wheel lift up, apparent wheel spin, chain slap, engine lugging) or any other riding condition which may not be expected to occur when the vehicle is operated in real traffic, that test run shall be discarded and a test run with different operating conditions shall be performed.

3.3.3. Data processing and reporting

3.3.3.1. The maximum A-weighted sound pressure level "L" indicated during the passage of the vehicle between AA' and when the rear of the vehicle passes BB' +20m (see Annex 4 – Figure 1) shall be reduced by 1 dB(A) to account

for measurement inaccuracy and mathematically rounded to the nearest first decimal place (e.g. XX.X) for each microphone position.¹

If a sound peak obviously out of character with the general sound pressure level is observed, the measurement shall be discarded, and the test run shall be repeated with the same operating conditions.

3.3.3.2. Processing of the sound pressure measurements and calculation of the final test results

$$L_{ASEP} = \text{MAX} (L_{ASEP, \text{left}}; L_{ASEP, \text{right}})$$

Where the index "left, "right" refers to the microphone position (left or right).

3.3.3.3. The engine speed values at AA', BB', and PP' in units of min⁻¹ shall be mathematically rounded to the nearest integer for further calculations

3.3.3.4. The final sound pressure levels for the additional operating conditions shall not exceed the limits specified in paragraph 2.6. of this Annex.

II. Justification

1. In order to address certain grey zones in the 04 series of amendments to UN Regulation No. 41 and to make the ASEP provisions more real-world representative, IWG ASEP has prepared this proposal for improvement.

2. The following table summarizes the proposed changes and substantial widening of the test window, compared to the current version:

	<i>R41-04 (current)</i>	<i>R41-05 proposal (ASEP revision)</i>
Speed range	20 – 80 km/h	10 – 100 km/h (for power-to-mass ratio (PMR) > 150)
Max Rpm	$3.4 * \text{PMR}^{-0.33} * (S - n_{\text{idle}}) + n_{\text{idle}}$	0,8 x S (= increased)
Gears tested	Fixed gear (not including 1 st)	Any gear (including 1 st)
Throttle operation (between AA' & BB')	Wide-open-throttle (WOT) only	Any constant throttle
Acceleration	WOT only	Any acceleration
Approach (pre-AA')	Constant speed	Any approach (constant speed, acceleration, deceleration)
number of test points	Reference points + 2 additional operating conditions	Reference points + [three additional operating conditions / gear]
CVT	Exemption if requirements of §1.2 of Annex 7 are met.	No exemption

3. The proposed changes need to be validated and will require certain vehicle designs to be modified, hence three years of lead time is needed. The transitional

¹ The sound pressure level „L“ is determined by a single test run

provisions also take into account alignment with the timing of the 'Euro 5+' step in the European Union (01.01.2024 for new vehicle types; 01.01.2025 for new vehicles).
