

Proposal for a 03 Series of amendments to UN Regulation No. 138

Introduced by the European Commission

Justification: this proposal aims at aligning the emission of AVAS sounds with safety needs

Uniform provisions concerning the approval of Quiet Road Transport Vehicles with regard to their reduced audibility

Contents

	<i>Page</i>
Regulation	
1. Scope.....	3
2. Definitions	3
3. Application for approval	6
4. Markings	7
5. Approval	7
6. Specifications.....	8
7. Modification and extension of approval of a vehicle type	11
8. Conformity of production.....	12
9. Penalties for non-conformity of production	12
10. Production definitively discontinued.....	12
11. Transitional provisions.....	13
12. Names and addresses of Technical Services responsible for conducting approval tests and of Type Approval Authorities.....	13
Annexes	
1 Communication.....	14
Addendum to the Communication Form (Technical Information document)	16
2 Arrangements of the approval mark.....	19
3 Methods and instruments for measuring the sound made by motor vehicles.....	20
Appendix: Figures and Flowcharts.....	32
4 Statement of compliance of Quiet Road Transport Vehicles (QRTV) with regard to their reduced audibility	41

1. Scope

This Regulation applies to electrified vehicles of categories M and N¹ which can be propelled in the normal mode, in reverse or at least one forward drive gear, without an internal combustion engine operating², in respect to their reduced audibility³ **and the resulting safety risk.**

2. Definitions

For the purpose of this Regulation,

2.1. "*Approval of a vehicle*" means the approval of a vehicle type with regard to **Acoustic Vehicle Alerting System**.~~sound;~~

2.2. "*Natural sound*" means sound coming from the vehicle and its components as a result of ~~e.g.~~ providing propulsion, braking, steering, cooling, or any other **mechanical** function **that is inherent to the operation of the vehicle.**

An exterior sound enhancement system, as defined in UN Regulation No. 51, Annex 9, paragraph 2.2. does not produce natural sound.

2.3. "*Acoustic Vehicle Alerting System*" (AVAS) means a component or set of components installed in vehicles with the **primary only** purpose to fulfil the requirements of this Regulation;

2.3.1. "*AVAS sound*" means a synthetic created sound which is controllable by an acoustic vehicle alerting systems. This ~~means the sound(s) and~~ sound is **characteristic(s)** emitted by an Acoustic Vehicle Alerting System (AVAS) to fulfil the requirements of this Regulation. The AVAS sound provides only ~~acoustic~~ safety information **on the vehicle's presence and operation** to pedestrians and other road users ~~on the vehicle's presence and operation.~~

2.4. "*Vehicle type*" means a category of motor vehicles which does not differ essentially in such respects as:

2.4.1. The shape and the materials of the bodywork of the vehicle which affect the sound level emitted~~;~~;

2.4.2. The principle of the drivetrain (from the batteries to the wheels). Notwithstanding the provisions of 2.4.1., vehicles which differ with respect to overall gear ratios, battery type or the fitment of a range extender may be considered vehicles of the same type;

2.4.3. If applicable, the number and type(s) of sound emitting devices (hardware) of AVAS fitted on the vehicle;

2.4.4. If applicable, the position of the AVAS on the vehicle.

2.5. "*Frequency Shift*" means the variation of the frequency content of the AVAS sound as a function of the vehicle speed.

2.6. "*Electrified vehicle*" means a vehicle with a powertrain containing at least one electric motor or electric motor-generator.

2.6.1. "*Pure Electric Vehicle*" (PEV) means a motor vehicle with an electric motor as its sole mean of propulsion.

¹ As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3).

² **At this stage, only acoustic measures shall be developed in order to overcome the concern of reduced audible signals from electrified vehicles. After finalisation, the appropriate GR shall be assigned with the enhancement of the Regulation in order to develop alternative, non-acoustic measures, taking into account active safety systems such as, but not limited to, pedestrian detection systems. To provide for environmental protection, this Regulation specifies also maximum limits.**

³ **See paragraph 5.1.1. for more detailed specifications on the application.**

- 2.6.2. "Hybrid Electric Vehicle" (HEV) means a vehicle with a powertrain containing at least one electric motor or electric motor generator and at least one internal combustion engine as propulsion energy converters.
- 2.6.3. "Fuel Cell vehicle" (FCV) means a vehicle with a fuel cell and an electric machine as propulsion energy converters.
- 2.6.4. "Fuel Cell Hybrid Vehicle" (FCHV) means a vehicle with at least one fuel storage system and at least one Rechargeable Electric Energy Storage System (REESS) as propulsion energy storage system.
- 2.7. "Mass in running order" means the mass of the vehicle, with its fuel tank(s) filled to at least 90% of its or their capacity/ies, including the mass of the driver (75 kg), of the fuel and liquids, fitted with the standard equipment in accordance with the manufacturer's specifications and, when they are fitted, the mass of the bodywork, the cabin, the coupling and the spare wheel(s) as well as the tools.
- 2.8. "Pause function" means a mechanism to enable the driver to halt the operation of an AVAS.
- 2.9. "Front plane of the vehicle" means a vertical plane tangent to the leading edge of the vehicle.
- 2.10. "Rear plane of the vehicle" means a vertical plane tangent to the trailing edge of the vehicle.
- 2.11. "Mandatory speed range": the speed range where an AVAS shall emit sound (AVAS sound) to fulfil the requirements of this Regulation.
- 2.12. "Lowest frequency of interest": the frequency below which there is no signal content relevant to the measurement of sound emission for the vehicle under test.
- 2.13. Symbols and abbreviated terms and the paragraph in which they are first used.

Table 1
Symbols and Abbreviations

Symbol	Unit	Paragraph	Explanation
Method (A)			Test of the complete vehicle in motion on an outdoor test track; limit values of paragraph 6.2.8. means to measure the whole vehicle sound
Method (B)			Test of the complete vehicle without movement in standstill condition on an outdoor test track with simulation of the vehicle movement to the AVAS by an external signal generator; limit values of paragraph 6.2.8. means to measure the AVAS sound
Method (C)			Test of the complete vehicle without movement with turning wheels in an indoor facility on a chassis dynamometer; limit values of paragraph 6.2.8. means to measure the whole vehicle sound
Method (D)			Test of the complete vehicle without movement in an indoor facility with simulation of the vehicle movement to the AVAS by an external signal generator; limit values of paragraph 6.2.8. means to measure the AVAS sound
ICE	-	6.2.	Internal Combustion Engine
AA'	-	Annex 3 para.3.	Line perpendicular to vehicle travel which indicates the beginning of the zone to record sound pressure level during test
BB'	-	Annex 3 para.3.	Line perpendicular to vehicle travel which indicates the end of the zone to record sound pressure level during test
PP'	-	Annex 3 para.3.	Line perpendicular to vehicle travel which indicates the location of microphones

<i>Symbol</i>	<i>Unit</i>	<i>Paragraph</i>	<i>Explanation</i>
CC'	-	Annex 3 para.3	Centreline of Line perpendicular to vehicle travel, equidistant from AA' and BB'
v_{test}	km/h	Annex 3 para.3.	Target vehicle test velocity
i	—	3.1.	Index for left or right microphone locations
j	-	Annex 3 para.3.	Index for single test run within standstill or constant speed test conditions
$L_{reverse}$	dB(A)	Annex 3 para.3.	Vehicle A-weighted sound pressure level for reversing test
$L_{crs,10}$	dB(A)	Annex 3 para.3.	Vehicle A-weighted sound pressure level for constant speed test at 10 km/h.
$L_{crs,20}$	dB(A)	Annex 3 para.3.	Vehicle A-weighted sound pressure level for constant speed test at 20 km/h.
$L_{test,j}$	dB(A)	Annex 3 para.2.3.2.	A-weighted sound pressure level result of j^{th} test run
L_{bgn}	dB(A)	Annex 3 para.2.3.1.	Background A-weighted sound pressure level.
L_{bgn_BAND}	dB(A)	Annex 3 paragraph 2.3.1.	Background noise one-third octave A-weighted sound pressure level.
v_{ref}	km/h	Annex 3 para.4.	Reference vehicle velocity used for calculating frequency shift percentage.
$f_{j, speed}$	Hz	Annex 3 para.4.	Single frequency component at a given vehicle speed per sample segment, e.g. $f_{1,5}$
f_{ref}	Hz	Annex 3 para.4.	Single frequency component at reference vehicle speed
f_{speed}	Hz	Annex 3 para.4.	Single frequency component at a given vehicle speed, e.g. f_5
l_{veh}	m	Annex 3, Appendix	Length of vehicle
MicLeft $_i$	—	Annex 3 para. 3.1.	i^{th} Microphone situated at left side of vehicle
MicRight $_i$	— —	Annex 3 para. 3.1. 7.1.1	i^{th} Microphone situated at right side of vehicle
MicLeft $_1$	—	Annex 3 para. 3.1.	Microphone situated at left side of vehicle, with height of 0,8 m above ground
MicLeft $_2$	—	Annex 3 para. 3.1.	Microphone situated at left side of vehicle, with height of 1,0 m above ground
MicLeft $_3$	—	Annex 3 para. 3.1	Microphone situated at left side of vehicle, with height of 1,2 m above ground
MicLeft $_4$	—	Annex 3 para. 3.1.	Microphone situated at left side of vehicle, with height of 1,4 m above ground
MicLeft $_5$	—	Annex 3 para. 3.1.	Microphone situated at left side of vehicle, with height of 1,6 m above ground
MicRight $_1$	—	Annex 3 para. 3.1.	Microphone situated at right side of vehicle, with height of 0,8 m above ground
MicRight $_2$	—	Annex 3 para. 3.1.	Microphone situated at right side of vehicle, with height of 1,0 m above ground
MicRight $_3$	—	Annex 3 para. 3.1.	Microphone situated at right side of vehicle, with height of 1,2 m above ground

<i>Symbol</i>	<i>Unit</i>	<i>Paragraph</i>	<i>Explanation</i>
MicRight ₄	—	Annex 3 para. 3.1.	Microphone situated at right side of vehicle, with height of 1,4 m above ground
MicRight ₅	—	Annex 3 para. 3.1.	Microphone situated at right side of vehicle, with height of 1,6 m above ground
$L_{\text{MicLeft}_i \text{OA}, j}$	dB(A)	Annex 3 para. 3.4.1.	Maximum overall sound pressure level result over the entire measurement interval for each MicLeft _{<i>i</i>} location for the <i>j</i> th measurement run
$L_{\text{MicRight}_i \text{OA}, j}$	dB(A)	Annex 3 para. 3.4.1.	Maximum overall sound pressure level result over the entire measurement interval for each MicRight _{<i>i</i>} location for the <i>j</i> th measurement run
$L_{\text{MicLeftOA}, j}$	dB(A)	Annex 3 para. 3.4.1.	Maximum overall sound pressure level result over the entire measurement interval for all MicLeft _{<i>i</i>} locations for the <i>j</i> th measurement run
$L_{\text{MicRightOA}, j}$	dB(A)	Annex 3 para. 3.4.1.	Maximum overall sound pressure level result over the entire measurement interval for all MicRight _{<i>i</i>} locations for the <i>j</i> th measurement run
$L_{\text{MicLeftOA}}$	dB(A)	Annex 3 para. 3.5.2.	Maximum overall sound pressure level result over the entire measurement interval for all MicLeft _{<i>i</i>} locations
$L_{\text{MicRightOA}}$	dB(A)	Annex 3 para. 3.5.2.	Maximum overall sound pressure level result over the entire measurement interval for all MicRight _{<i>i</i>} locations
$L_{\text{MicLeft}_i \text{BAND}, j}$	dB(A)	Annex 3 para. 3.4.1.	Maximum one-third-octave sound pressure level result for each band over the entire measurement interval for each MicLeft _{<i>i</i>} location for the <i>j</i> th measurement run
$L_{\text{MicRight}_i \text{BAND}, j}$	dB(A)	Annex 3 para. 3.4.1.	Maximum one-third-octave sound pressure level result for each band over the entire measurement interval for each MicRight _{<i>i</i>} location for the <i>j</i> th measurement run
$L_{\text{MicLeftBAND}, j}$	dB(A)	Annex 3 para. 3.5.1.	Maximum one-third octave results for each band over the entire measurement interval for all MicLeft _{<i>i</i>} locations for the <i>j</i> th measurement run
$L_{\text{MicRightBAND}, j}$	dB(A)	Annex 3 para. 3.5.1.	Maximum one-third octave results for each band over the entire measurement interval for all MicRight _{<i>i</i>} locations for the <i>j</i> th measurement run
$L_{\text{MicLeftBAND}}$	dB(A)	Annex 3 para. 3.5.3.	Maximum one-third octave sound pressure level over the entire measurement interval for all MicLeft _{<i>i</i>} locations averaged over all <i>j</i> measurement runs
$L_{\text{MicRightBAND}}$	dB(A)	Annex 3 para. 3.5.3.	Maximum one-third octave sound pressure level over the entire measurement interval for all MicRight _{<i>i</i>} locations averaged over all <i>j</i> measurement runs

3. Application for approval

- 3.1. The application for approval of a vehicle type with regard to reduced audibility shall be submitted by its manufacturer or by a duly accredited representative.
- 3.2. It shall be accompanied by the undermentioned documents and the following particulars:
 - 3.2.1. A description of the vehicle type with regard to the items mentioned in paragraph 2.4. above;
 - 3.2.2. A description of the engine(s) as mentioned in Annex 1, Addendum;
 - 3.2.3. If applicable, a list of the components constituting the AVAS;
 - 3.2.4. If applicable, a drawing of the assembled AVAS and an indication of its position on the vehicle.

- 3.3. In the case of paragraph 2.4., the single vehicle, representative of the type in question, will be selected by the Technical Service conducting approval tests, **in agreement after discussion** with the vehicle manufacturer.
- 3.4. The Type Approval Authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type approval is granted.

4. Markings

- 4.1. The components of the AVAS (if applicable) shall bear:
- 4.1.1. The trade name or mark of the manufacturer(s) of the AVAS components;
- 4.1.2. A designated identification number(s).
- 4.2. These markings shall be clearly legible and **be** indelible.

5. Approval

- 5.1. Type approval shall only be granted if the vehicle type meets the requirements of paragraphs **6. and 7. of this Regulation** below.

~~5.1.1. In case of hybrid vehicles, equipped with an internal combustion engine: If the manufacturer can demonstrate to the Type Approval Authority that the vehicle cannot be assessed according to the provisions of the regulation because the internal combustion engine used for direct propulsion will be operational during the specified tests within this regulation, this regulation shall be deemed not to be applicable to this vehicle.~~

- 5.2. An approval number shall be assigned to each type approved. Its first two digits (at present **203** corresponding to the **203** series of amendments) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to **two different another** vehicle types.
- 5.3. Notice of approval or **notice** of extension or **notice** of refusal or **notice of** withdrawal of approval or **notice** of production definitively discontinued of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation by means of a form conforming to the model in Annex 1 to this Regulation.
- 5.4. There shall be affixed to every vehicle conforming to a vehicle type approved under this Regulation, conspicuously and in a readily accessible place specified on the approval form, an international approval mark consisting of:
- 5.4.1. A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval;
- 5.4.2. The number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in paragraph 5.4.1.
- 5.5. If the vehicle conforms to a vehicle type approved, under one or more other Regulations annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 5.4.1. **needs** not be repeated. In such a case the regulation and approval numbers and the additional symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 5.4.1.
- 5.6. The approval mark shall be clearly legible and indelible.

- 5.7. The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.
- 5.8. Annex 2 to this Regulation gives examples of arrangements of the approval mark.

6. Specifications

6.1. General specifications

For the purpose of this Regulation, the vehicle shall fulfil the following requirements:

~~Acoustics characteristics~~

The sound emitted by the vehicle type submitted for approval shall be measured by the methods described in Annex 3 to this Regulation.

The specifications of this Regulation are applicable in forward and reverse driving condition for the mandatory speed range of greater than 0 km/h up to and inclusive ~~30~~ ~~20~~ km/h. **In this speed range, any other artificial sound emission is prohibited.** Operation of an AVAS is permitted at vehicle speeds outside the mandatory speed range, the maximum sound pressure levels for the AVAS sound specified in this Regulation in Table 2a and Table 2b of paragraph 6.2.8. apply. An AVAS sound is only allowed in forward driving direction of the vehicle in the speed range mentioned in Table 2a and for all speeds in reverse direction.

AVAS characteristics beside the tested vehicle speeds during type approval can be declared either by manufacturer declaration in Annex 4 or by additional tests. These tests **can be decided by** ~~shall be agreed between the manufacturer and the~~ ~~f~~Type ~~a~~Approval ~~a~~Authority.

~~AVAS may be operational independent of the operation of an internal combustion engine inside or outside the mandatory speed range.~~

~~If a vehicle that is not equipped with an AVAS fulfils the minimum overall levels as specified in Table 2a below with a margin of +3 dB(A) by its natural sound, the specification for one third octave bands as specified in paragraph 6.2.8. Table 3 and the frequency shift as specified in paragraph 6.2.3. do not apply.~~

~~If a vehicle in scope of UN Regulation No. 165 is equipped with an audible reverse warning system, providing an audible signal that exceeds the minimum overall levels as specified in Table 2b of this regulation, the audible reverse warning signal is deemed to fulfil this regulation in reverse driving, without the sound from an AVAS.~~

6.2. Need for an AVAS

6.2.1. **In case of hybrid vehicles, equipped with an internal combustion engine: If the manufacturer can demonstrate to the Type Approval Authority that the internal combustion engine used for direct propulsion will be operational at all speeds up to 30 km/h, this regulation shall be deemed not to be applicable to this vehicle. The vehicle shall therefore not be equipped with an AVAS.**

6.2.2. **To determine whether a vehicle in the scope of this regulation needs to be equipped with an AVAS:**

- **the whole vehicle sound is measured by method (A) or method (C) (if need be with AVAS disabled)**
- **those measurements are completed by a manufacturer declaration to cover all other speeds of Table 2a and Table 2b of paragraph 6.13.**

6.2.3. Need for an AVAS in forward driving:

If the natural sound of the vehicle exceeds the minimum sound requirements as specified in Table 2a of paragraph 6.13., that vehicle shall not be equipped with an AVAS for forward driving.

If after a vehicle is tested in accordance with Annex 3 paragraph 3.3.2. for ten consecutive times within a series of measurements without recording a valid measurement because the vehicle's internal combustion engine (ICE) remains active or restarts and interferes with the measurements, the vehicle is deemed not to need the emission of an AVAS sound in forward driving.

6.2.4. Need for an AVAS in reverse driving:

If the natural sound of a vehicle exceeds the minimum sound requirements as specified in Table 2b of paragraph 6.13., that vehicle shall not be equipped with an AVAS for reverse driving.

If after a vehicle is tested in accordance with Annex 3 paragraph 3.3.3. for ten consecutive times within a series of measurements without recording a valid measurement because the vehicle's internal combustion engine (ICE) remains active or restarts and interferes with the measurements, the vehicle is deemed not to need the emission of an AVAS sound in reverse driving.

If a vehicle in scope of UN Regulation No. 165 is equipped with an audible reverse warning system, providing an audible signal that exceeds the minimum overall levels as specified in Table 2b of paragraph 6.13., the audible reverse warning signal is deemed to fulfil this Regulation in reverse driving, without the sound from an AVAS. That vehicle shall therefore not be equipped with an AVAS for reverse driving.

6.3. Mandatory and optional emissions of an AVAS sound

6.3.1. In forward driving: in forward driving, a mandatory AVAS sound shall be emitted when the speed of the vehicle is greater than 0 km/h and less than or equal to 30 km/h.

6.3.2. In reverse driving: in reverse driving, a mandatory AVAS sound shall be emitted when the speed of the vehicle is greater than 0 km/h and less than or equal to 30 km/h.

6.3.3. In standstill condition: in standstill condition, a mandatory AVAS sound shall be emitted when the gear selector is in reverse driving position (e.g. "R").

6.3.4. In standstill condition: in standstill condition, an optional AVAS sound is allowed when the gear selector is in forward driving position (e.g. "D").

6.4. Constant speed tests for forward driving

The test speeds for approval tests are 10 km/h and 20 km/h. Compliance with other speeds covered by Table 2a of paragraph 6.2.8, 6.13. shall be given by a manufacturer declaration (Annex 4).

When tested under the conditions of Annex 3 paragraph 3.3.2., the vehicle shall emit a sound

(a) That has a minimum overall sound pressure level for the specified speed range according to Table 2a of paragraph 6.2.8.;

(b) That has at least two of the one third octave bands according to Table 3 of paragraph 6.2.8. At least one of these bands shall be below or within the 1,600 Hz one third octave band;

(c) With minimum sound pressure levels in the chosen bands for the applicable test speeds according to Table 3 of paragraph 6.2.8.

~~6.3.4.1.1. — If after a vehicle is tested in accordance with Annex 3 paragraph 3.3.2., for ten consecutive times within a series of measurements without recording a valid measurement because the vehicle's internal combustion engine (ICE) remains active or restarts and interferes with the measurements, the vehicle is exempted from this particular test.~~

6.5. Reversing test

When tested under the conditions of Annex 3 paragraph 3.3.3. the vehicle must emit a sound that has a minimum overall sound pressure level according to Table 2b of paragraph ~~6.2.8.~~ **6.13.** Compliance with other speeds covered by Table 2b of paragraph ~~6.2.8.~~ **6.13.** shall be given by a manufacturer declaration (Annex 4).

~~6.3.4.1.2. — If after a vehicle is tested in accordance with Annex 3, paragraph 3.3.3., for ten consecutive times within a series of measurements without recording a valid measurement because the vehicle's ICE remains active or restarts and interferes with the measurements, the vehicle is exempted from this particular test.~~

6.6. Frequency shift to signify acceleration and deceleration

The intention of frequency shift is to acoustically inform road users of changes in the vehicle speed.

When tested under the conditions of Annex 3 paragraph 4 at least one tone within the frequency range as specified in paragraph ~~6.2.8.~~ **6.13. of the AVAS sound** emitted by the vehicle shall vary proportionally with speed within each individual gear ratio by an average of at least 0.8% per 1 km/h in the speed range from 5 km/h to ~~230~~ km/h inclusive when driving in forward direction. In case more than one frequency is shifted, only one frequency shift needs to fulfil the requirements.

6.7. Prohibition of defeat devices

The vehicle manufacturer shall not intentionally alter, adjust, or introduce any mechanical, electrical, thermal, or other device or procedure solely for the purpose of fulfilling the requirements of this Regulation and that is not operational or is significantly different during typical on-road operation.

6.8. Sound of the vehicle in standstill condition

An AVAS sound in standstill condition shall be in compliance with the specifications outlined in paragraph **6.13.** ~~6.2.8.~~ Tables **2a** and **2b**.

The vehicle may emit an AVAS sound only when it is in standstill condition and the propulsion system is activated and:

- in case of a vehicle with an automatic transmission, the vehicle's gear selector is any gear position other than Park; or
- in case of a vehicle with a manual transmission, the vehicle's parking brake is released.

When the vehicle is in standstill condition and the gear selector is in reverse driving position, an AVAS sound is mandatory.

6.9. Driver selectable AVAS sounds

The vehicle manufacturer may define alternative sounds which can be selected by the driver. **Each** of these sounds shall be in compliance and approved with the provisions in paragraphs **6.4., 6.5., 6.6., 6.7. and 6.8.** ~~6.2.1. to 6.2.4.~~

The compliance ~~of with~~ paragraph **6.13.** ~~6.2.8.~~ Table **2a** and Table **2b** of non-tested sound modes during type approval in respect to Annex 3 paragraph 3.2.3. shall be confirmed by the manufacturer declaration (Annex 4).

6.10. AVAS sound level variation

If fitted, an AVAS may operate at different sound levels either automatically managed by the control unit or manually selected by the driver. Each selected sound level shall be in compliance with the specifications outlined in paragraphs **6.4., 6.5., 6.6., 6.7. and 6.8.** ~~6.2.1. to 6.2.4. and paragraph 6.13. 6.2.8.~~

The compliance ~~of with~~ paragraph **6.13. 6.2.8.**, Tables 2a and 2b of non-tested sound modes during type approval in respect to Annex 3, paragraph 3.2.3. shall be confirmed by the manufacturer declaration (Annex 4).

All combinations of AVAS sound level variations and AVAS sound shall fulfil the requirements of paragraph **6.13. 6.2.8.**, Table 2a, Table 2b and Table 3.

6.11. Pause Function

In the mandatory speed range as defined in ~~the second sentence of~~ paragraph **6.3. 6.2.**, ~~an the~~ AVAS sound shall always be emitted.

Any pause function as defined in paragraph 2.8. shall be allowed only **when the vehicle is in standstill condition and the gear selector is in forward driving position (e.g. "D") outside the mandatory speed range. The pause function will be automatically deactivated and the AVAS signal will be emitted when the vehicle starts moving.**

6.12. Acoustic characteristics of the AVAS sound ~~Specifications on minimum and maximum sound level for AVAS sound~~

~~When tested under the conditions of Annex 3 paragraph 3.3.2, a vehicle which is equipped with an AVAS shall fulfil the requirements of Table 2a, Table 2b and Table 3.~~

~~The sound emission of the vehicle under typical on road driving conditions, which are different from those under which the type approval test set out in Annex 3 was carried out, shall not deviate from the test result in a significant manner.~~

~~In the speed range of Table 2a and Table 2b and when tested under the conditions of Annex 3 paragraph 3.3.2., a vehicle which is equipped with an AVAS, shall not emit an AVAS overall sound level of more than 75 dB(A), if driving in forward direction. This test can be stated by manufacturer declaration.~~

~~During measurement in reverse the maximum level requirement in the frontline of the vehicle for forward driving has to be fulfilled in addition. This can be stated by manufacturer declaration.~~

~~The sound levels measured and reported shall be mathematically rounded to the nearest integer value.~~

The ~~sound emitted by the~~ **AVAS sound of the** vehicle type submitted for approval shall be measured by the methods **B or method D** described in Annex 3 to this Regulation.

AVAS **sound** characteristics beside the tested vehicle speeds during type approval can be declared either by manufacturer declaration (~~in~~ Annex 4) or by additional tests. These tests **shall be decided by** ~~shall be agreed between the manufacturer and the~~ ~~†~~Type aApproval aAuthority.

Minimum and maximum sound pressure levels of the AVAS sound: the minimum and maximum sound pressure levels of the AVAS sound shall be such that the sound emitted by the whole vehicle equipped with the AVAS complies with the minimum and maximum sound pressure levels of Table 2a (for forward driving) and Table 2b (for reverse driving).

1/3rd octave-bands minimum sound level requirements: the AVAS sound shall comply with the 1/3rd octave bands minimum sound level requirements of Table 3.

6.13. Acoustic characteristics of the sound emitted by the whole vehicle equipped with an AVAS

The sound emitted by the whole vehicle type submitted for approval shall be measured by method A or method C described in Annex 3 to this Regulation.

The whole vehicle sound characteristics beside the tested vehicle speeds during type approval can be declared either by manufacturer declaration (Annex 4) or by additional tests. These tests shall be decided by the Type Approval Authority.

When tested under the conditions of Annex 3 paragraph 3.3.2, a vehicle which is equipped with an AVAS shall fulfil the requirements of Table 2a, and Table 2b and Table 3.

Table 2a

AVAS Minimum and Maximum Overall Sound Pressure Levels⁴ for Forward Driving (e.g., "D")

Vehicle-Speed <i>v</i> in km/h	Minimum Overall SPL in dB(A)		Maximum Overall SPL in dB(A)	
	Forward Driving (e.g., "D")	Vehicle movement blocked (e.g., Position "P")	Forward Driving	Vehicle movement blocked (e.g., Position "P")
0 Standstill	-	*	69 60	*
0 < <i>v</i> < 10	4 58		75 64	
10	5 03		75 64	
10 < <i>v</i> < 20	5 03		75 67	
20	56		75 67	
20 < <i>v</i> ≤ 530	56		75 1	
30	58		71	

⁴ The overall sound pressure level in Tables 2a and 2b is measured at a distance of 2 m, which implies that ~~75~~ 71 dB(A) is corresponding to the overall sound pressure level of ~~66~~ 62 dB(A) measured at a distance of 7.5 m. The limit value of 66 dB(A) at a distance of 7.5 m is the lowest permitted maximum value in Regulations established under the 1958 Agreement.

Table 2b

AVAS Minimum and Maximum Overall Sound Pressure Levels for Reverse Driving (e.g., "R")

Vehicle-Speed v in km/h	Minimum Overall SPL in dB(A)		Maximum Overall SPL in dB(A)	
	Reverse Driving (e.g., "R")	Vehicle movement blocked (e.g., Position "P")	Reverse Driving	Vehicle movement blocked (e.g., Position "P")
0 Standstill	4748	*	6960	*
$0 < v < 6$	4748		7564	
6	4748		7564	
$6 < v \leq 2310$	4748		7564	
10	53		64	
$10 < v < 20$	53		67	
20	56		67	
$20 < v < 30$	56		71	
30	58		71	

Explanation for Table 2a and Table 2b

##	Tests have to be done during type approval and reported inside the Test Report
##	Compliance with the regulation by manufacturer declaration
-	No required sound pressure level for AVAS sound
*	No AVAS sound allowed

Table 3

1/3rd Octave-Bands Minimum Sound Level Requirements in dB(A)

Frequency in Hz	Constant Speed Test paragraph 3.3.2. (10 km/h)	Constant Speed Test paragraph 3.3.2. (20 km/h)
	1/3 rd Octave Bands	160
200		44
250		43
315		44
400		45
500		45
630		46
800		46
1,000		46
1,250		46
1,600		44
2,000		42
2,500		39
3,150		36
4,000		34
5,000	31	

7. Modification and extension of approval of a vehicle type

- 7.1. Every modification of the vehicle type shall be notified to the Type Approval Authority which approved the vehicle type. The Type Approval Authority may then either:
 - 7.1.1. consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the vehicle still complies with the requirements, or
 - 7.1.2. require a further test report from the Technical Service responsible for conducting the tests.
- 7.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 5.3. above to the Parties to the Agreement applying this Regulation.
- 7.3. The Type Approval Authority issuing the extension of approval shall assign a series number for such an extension and inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

8. Conformity of production

The conformity of production procedures shall comply with those set out in the Agreement, Schedule 1 (E/ECE/324-E/ECE/TRANS/505/Rev.3) with the following requirements:

- 8.1. Vehicles approved according to this Regulation shall be manufactured so as to conform to the type approved and satisfy the requirements set forth in paragraph 6.2. above.
- 8.2. The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be **once** every two years.

In case of Conformity of Production tests, only tests according to paragraph 6.2. shall be performed.

If the sound level of the vehicle tested pursuant to paragraphs 3.3.2. and 3.3.3. of Annex 3 does not exceed by more than 1 dB(A) the maximum sound pressure level limit value and without a tolerance to the minimum sound pressure level limit value prescribed in paragraph 6.13. 6.2.8. Tables 2a and 2b of this Regulation, the vehicle type shall be considered to conform to the requirements of this Regulation.

~~If Conformity of Production is performed using Method (A) and the original Type Approval was conducted using Methods (B) or (D), an additional 1 dB(A) tolerance is applied only for maximum overall sound pressure level requirements.~~

9. Penalties for non-conformity of production

- 9.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirements set forth above are not met.
- 9.2. If a Contracting Party to the Agreement applying this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation, by means of a communication form conforming to the model in Annex 1 to this Regulation.

10. Production definitively discontinued

If the holder of the approval completely ceases to manufacture a vehicle type approved in accordance with this Regulation, he shall so inform the authority which granted the approval. Upon receiving the relevant communication that authority shall inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

11. Transitional provisions

- 11.1. Until 24 September 2028, ISO 10844:2014 may be applied as an alternative to ISO 10844:2021 to check compliance of the test track as described in Annex 3, paragraph 2.1.2. of this Regulation.
- 11.2. As from the official date of entry into force of the 0203 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 0203 series of amendments.
- 11.3. As from 1 September 20267, Contracting Parties applying this Regulation shall not be obliged to accept type approvals to this Regulation as amended by the 01 and 02 series of amendments, first issued after 1 September 20267.
- 11.4. Until 1 September 20289, Contracting Parties applying this Regulation shall accept type approvals to this Regulation in its 01 and 02 series of amendments, first issued before 1 September 20267.
- 11.5. As from 1 September 20289, Contracting Parties applying this Regulation shall not be obliged to accept type approvals to this Regulation in its 01 and 02 series of amendments.
- 11.6. Notwithstanding the transitional provisions above, Contracting Parties whose application of this Regulation comes into force after the date of entry into force of the 0203 series of amendments are not obliged to accept type approvals which were granted in accordance with this Regulation in its earlier series of amendments and are only obliged to accept type approval granted in accordance with the 0203 series of amendments.
- 11.6. Contracting Parties applying this Regulation shall not refuse to grant type approvals, or extensions thereof, under this Regulation in its 01 and 02 series of amendments.

12. Names and addresses of Technical Services responsible for conducting approval tests and of Type Approval Authorities

The Contracting Parties to the 1958 Agreement applying this Regulation shall communicate to the United Nations Secretariat the names and addresses of the Technical Services responsible for conducting approval tests and of the Type Approval Authorities which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval, issued in other countries, are to be sent.