

Revised Proposal for Regulation No 28 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of audible warning devices and of motor vehicles with regard to their audible signals

The text reproduced below was prepared by the experts from Turkey based on GRB-64-05. The modifications are highlighted in yellow.

Incorporating all valid text up to:

Supplement 3 to the original version of the Regulation

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1. SCOPE

This Regulation applies to:

1.1. audible warning devices (AWD)¹ emitting a uniform and continuous sound (so called horn or signal horn), supplied with direct or alternating current or compressed air, which are intended for fitting to motor vehicles of categories L3 to 5, M and N, excluding mopeds (categories L1 and L2)² and
 1.2 reversing audible warning devices (RAWD) acting intermittent (so called beeper) automatically activated when reverse gear is selected and the engine running (reverse alarm³) supplied with direct or alternating current, which are intended for fitting to motor vehicles of categories [M2], [N2], N3 and M3;

1.23. the audible signals⁴ of motor vehicles listed in 1.1 and 1.2.

I. AUDIBLE WARNING DEVICES

2. DEFINITIONS

For the purposes of this Regulation, audible warning devices (AWD) of different 'types' shall be understood to mean devices essentially different from one another with respect to such matters as:

- 2.1. trade name or mark;
- 2.2. principles of operation (continuously AWD (horn) and intermittent RAWD (reverse alarm));
- 2.3 type of electrical supply (direct or alternating current);
- 2.4. outer shape of case;
- 2.5. shape and dimensions of diaphragm(s);
- 2.6. shape or kind of sound outlet(s);
- 2.7. rated sound frequency or frequencies;
- 2.8. rated supply voltage;
- 2.9. for devices according 1.1 supplied directly from an external compressed air source, rated operating pressure.
- 2.10. The AWD is principally intended for:
 - 2.10.1. continuously emitted sound of motor cycles of a power less than or equal to 7 kW (class I);
 - 2.10.2. continuously emitted sound of vehicles of categories M and N and motor cycles of a power greater than 7 kW (class II);
 - 2.10.3 reversing audible warning devices (RAWD) of vehicles of categories [M2], [N2], N3 and M3, acting intermittent automatically, activated when reverse gear is selected and the engine running (reverse alarm), adjustable by the driver in different sound levels (class III);
 - 2.10.4 reversing audible warning devices (RAWD) of vehicles of categories [M2], [N2], N3 and M3, acting intermittent automatically, activated when reverse gear is selected and the engine running (reverse alarm), automatically sound levels adjusted after measuring ambient noise level (class IV).

¹ An AWD consisting of several sound outlets activated by a single power unit shall be regarded as an AWD.

² As defined in the Consolidated Resolution (R.E.3).

³ For ease of understanding "warning devices (AWD) automatically activated when reverse gear is selected and the engine running" only called "reverse alarm".

⁴ An AWD consisting of several units, each emitting a sound signal and operated simultaneously by the actuation of a single control shall be regarded as an audible warning system.

3. APPLICATION FOR APPROVAL

3.1. The application for approval of a type of audible warning device shall be submitted by the holder of the trade name or mark or by his duly accredited representative.

3.2. It shall be accompanied by the following documents, in triplicate, giving the following particulars:

3.2.1. a description of [the class \(I, II, III or IV\) and](#) the type of audible warning device, paying particular attention to the points mentioned in paragraph 2;

3.2.2. a drawing showing, inter alia, the warning device in cross section;

3.2.3. a list of the components used in manufacture, duly identified, with an indication of the materials used;

3.2.4. detailed drawings of all the components used in manufacture. The drawings shall show the place provided for the approval number in relation to the circle of the approval mark. EN L 323/34 Official Journal of the European Union 6.12.2011

(1) An AWD consisting of several sound outlets activated by a single power unit shall be regarded as an AWD.

(2) As defined in the Consolidated Resolution (R.E.3).

(3) An AWD consisting of several units, each emitting a sound signal and operated simultaneously by the actuation of a single control shall be regarded as an audible warning system.

3.3. In addition, the application for approval shall be accompanied by two samples of the type of warning device.

3.4. The competent 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 samples of the audible warning devices submitted for approval shall bear the manufacturer's trade name or mark; this mark must be clearly legible and indelible.

4.2. Each sample shall have a space of adequate dimensions for the approval mark; this space shall be indicated in the drawing referred to in paragraph 3.2.2.

5. APPROVAL

5.1. If the samples submitted for approval conform to the provisions of paragraphs 6 and 7 below, approval for this type of warning device shall be granted.

5.2. An approval number shall be assigned to each type approved. Its first two digits (at present 00 for the Regulation in its original form) 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 may not assign this number to another type of audible warning device.

5.3. The same approval number may be assigned to types of warning device differing only with respect to rated voltage, rated frequency or frequencies or, for the devices mentioned in paragraph 2.8 above, rated operating pressure.

5.4. Notice of approval or refusal or extension or withdrawal of approval or production definitely discontinued of a type of warning device 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 the Regulation, and of drawings of the audible warning device (supplied by the applicant for approval) with maximum format A4 (210 × 297 mm) or folded to this format and on the scale 1:1.

5.5. On every audible warning device which conforms to a type approved under this Regulation, there shall be affixed conspicuously, in an easily accessible place indicated on the approval form, an international approval mark comprising:

- 5.5.1. a circle containing the letter 'E' followed by the distinguishing number of the country granting approval⁵;
- 5.5.2. an approval number;
- 5.5.3. an additional symbol in the form of a figure in Roman numerals, showing the class to which the AWD belongs.
- 5.6. The approval mark and the additional symbol must be clearly legible and indelible.
- 5.7. Annex 3, Section I, to this Regulation gives an example of the arrangement of the approval mark.

6. SPECIFICATIONS

6.1. General specifications

6.1.1. The audible warning device [of class I and II](#) shall emit a continuous and uniform sound; its acoustic spectrum shall not vary substantially during its operation.

For warning devices supplied with alternating current, this requirement shall apply only at constant generator speed, within the range specified in paragraph 6.2.3.2.

[6.1.2. The audible warning device of class III and IV shall emit a uniform sound. The number of cycles shall be periodically between 50 and 100 cycles per minute. Its acoustic spectrum and the number of cycles shall not vary substantially during its operation.](#)

6.1.2.3. The warning device shall have acoustic characteristics (spectral distribution of the acoustic energy, sound pressure level) and mechanical characteristics such that it passes, in the order indicated, the following tests.

6.2. Measurement of the sound characteristics

6.2.1. The warning device should, preferably, be tested in an anechoic environment.

Alternatively, it may be tested in a semi-anechoic chamber or in an open space⁶. In this case, precautions shall be taken to avoid reflections from the ground within the measuring area (for instance by erecting a set of absorbing screens). Compliance with the spherical divergence to a limit of 1 dB within a hemisphere of not less than 5 m radius, up to the maximum frequency to be measured, especially in the measuring direction and at the height of the apparatus and the microphone, shall be checked.

The ambient noise level shall be at least 10 dB lower than the sound pressure level to be measured.

The device to be tested and the microphone shall be placed at the same height. This height shall be between 1,15 and 1,25 m. The axis of maximum sensitivity of the microphone shall coincide with the direction of the maximum sound level of the device.

⁵ Czech Republic, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal, 22 for the Russian Federation, 23 for Greece, 24 for Ireland, 25 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32 for Latvia, 33 (vacant), 34 for Bulgaria, 35-36 (vacant), 37 for Turkey, 38-39 (vacant), 40 for The former Yugoslav Republic of Macedonia, 41 (vacant), 42 for the European Community (Approvals are granted by its Member States using their respective ECE symbol), 43 for Japan, 44 (vacant), 45 for Australia, 46 for Ukraine and 47 for South Africa. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the 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, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

⁶ The site may take the form, for instance, of an open space of 50 metres radius, the central part of which must be practically horizontal over a radius of at least 20 metres, the surface being of concrete, asphalt or a similar material, which must not be covered with powdery snow, tall weeds, or loose soil or cinders. The measurements shall be made on a clear day. No-one other than the observer reading the instrument shall remain near the audible warning device or the microphone, since the presence of spectators may affect the readings of the instrument to a considerable extent, if they are near the audible warning device or the microphone. Any peak which appears to be unrelated to the general sound level shall be disregarded in the reading.

The microphone shall be so placed that its diaphragm is at a distance of $2 \pm 0,01$ m from the plane of the sound outlet of the device. In the case of devices with several outlets, the distance shall be determined in relation to the plane of the nearest outlet to the microphone.

6.2.2. The measurements of the sound pressure levels shall be made with a class 1 precision sound level metre conforming to the specifications of IEC Publication No 651, first edition (1979). All measurements shall be made using the time constant 'F'. The measurement of the overall sound pressure level shall be made using the weighting curve A. The spectrum of the sound emitted shall be measured according to the Fourier transform of the acoustic signal.

Alternatively, one-third octave filters conforming to the specifications of IEC Publication No 225, first edition (1966) may be used in this case, the sound pressure level in the mid-band frequency 2 500 Hz shall be determined by adding the quadratic means of the sound pressures in the one- third mid-band frequencies 2 000, 2 500 and 3 150 Hz.

In every case, only the Fourier transform method shall be regarded as a reference method.

6.2.3. The AWD shall be supplied with current, as appropriate, at one of the test voltages:

6.2.3.1. in the case of AWDs supplied with direct current, at a voltage measured at the terminal of the electric power source of $13/12$ of the rated voltage. EN L 323/36 Official Journal of the European Union 6.12.2011

(1) The site may take the form, for instance, of an open space of 50 metres radius, the central part of which must be practically horizontal over a radius of at least 20 metres, the surface being of concrete, asphalt or a similar material, which must not be covered with powdery snow, tall weeds, or loose soil or cinders. The measurements shall be made on a clear day. No-one other than the observer reading the instrument shall remain near the audible warning device or the microphone, since the presence of spectators may affect the readings of the instrument to a considerable extent, if they are near the audible warning device or the microphone. Any peak which appears to be unrelated to the general sound level shall be disregarded in the reading.

6.2.3.2. in the case of AWDs supplied with alternating current, the current shall be supplied by an electric generator of the type normally used with this type of AWD. The acoustic characteristics of the AWD shall be recorded for electric generator speeds corresponding to 50 %, 75 % and 100 % of the maximum speed indicated by the manufacturer of the generator for continuous operation. During this test, no other electrical load shall be imposed on the electric generator. The endurance test described in paragraph 6.3 shall be carried out at a speed indicated by the manufacturer of the equipment and selected from the above range.

6.2.4. If a rectified current source is used for the test of an AWD supplied with direct current, the alternating component of the voltage measured at its terminals, when the warning devices are in operation, shall not be more than 0,1 volt, peak to peak.

6.2.5. For AWDs supplied with direct current, the resistance of the connecting leads, expressed in ohms, including terminals and contacts, shall be as close as possible to $(0,10/12) \times$ rated voltage in volts.

6.2.6. The warning device shall be mounted rigidly, by means of the equipment indicated by the manufacturer, on a support whose mass is at least ten times that of the warning device under test and not less than 30 kg. In addition, arrangements must be made to ensure that reflexions on the sides of the support and its own vibrations have no appreciable effect on the measuring results.

6.2.7. Under the conditions set forth above, the sound pressure weighted in accordance with curve A shall not exceed the following values:

(a) 115 dB(A) for AWDs [of class I](#) intended principally for motor cycles with a power less than or equal to 7 kW;

(b) 118 dB(A) for AWDs [of class II](#) intended principally for vehicles of categories M and N, and motor cycles with a power greater than 7 kW.

~~(c) [106] dB(A) for RAWDs of class III and class IV intended principally for vehicles of categories M and N.~~

~~(e) [106] dB(A) for AWDs of class III at the adjustable sound level "High" and class IV.~~

~~(d) [90] dB(A) for AWDs of class III at the adjustable sound level "Normal".~~

~~(e) [70] dB(A) for AWDs of class III at the adjustable sound level "Low".~~

6.2.7.1. In addition, the sound-pressure level of AWD of class I and II in the frequency band 1 800 to 3 550 Hz shall be greater than that of any component of a frequency above 3 550 Hz and in any event equal to or greater than:

(a) 95 dB(A) for AWDs of class I intended principally for motor cycles with a power less than or equal to 7 kW;

(b) 105 dB(A) for AWDs of class II intended principally for vehicles of categories M and N, and motor cycles with a power greater than 7 kW.

6.2.7.2. AWDs meeting the sound characteristics mentioned in (b) may be used on the vehicles mentioned in (a).

6.2.7.3. In addition, the sound-pressure level of RAWD of class III in the frequency band [1 500] to [3 550] Hz shall be greater than that of any component of a frequency above [3 550] Hz and in any event equal to or greater than [70] dB(A) for RAWDs intended principally for vehicles of categories M and N.;

~~(a) [92] dB(A) for AWDs at the adjustable sound level "High".~~

~~(b) [80] dB(A) for AWDs at the adjustable sound level "Normal".~~

~~(c) [64] dB(A) for AWDs at the adjustable sound level "Low".~~

6.2.7.4. In addition, the sound-pressure level of AWD of class IV in the frequency band [1 500] to [3 550] Hz shall be greater than that of any component of a frequency above [3 550] Hz and in any event equal to or greater than [92] dB(A) for AWDs under the condition according to 6.2.7 (c).

6.2.8. The specifications indicated above shall also be met by a device subjected to the endurance test referred to in paragraph 6.3 below, with the supply voltage varying between 115 % and 95 % of its rated voltage for AWDs supplied with direct current or, for AWDs supplied with alternating current, between 50 % and 100 % of the maximum speed of the generator indicated by the manufacturer for continuous operations.

6.2.9. The time lapse between the moment when the device is actuated and the moment when the sound reaches the minimum value prescribed in paragraph 6.2.7 above shall not exceed 0,2 seconds measured at an ambient temperature of $20 + 5$ °C. This provision is applicable, inter alia, to pneumatic or electro-pneumatic warning devices.

6.2.10. Pneumatic or electro-pneumatic warning devices of class I and II shall, when operating under the power supply conditions established for the devices by the manufacturers, satisfy the same acoustic requirements as are prescribed for electrically operated audible warning devices.

6.2.11. In the case of multiple-tone devices of class I and II in which each sound-emitting unit is capable of functioning independently, the minimum values specified above shall be obtained when each of the constituent units is operated separately. The maximum value of the overall sound level shall not be exceeded when all the constituent units are operated simultaneously.

6.3. Endurance test

6.3.1. The AWD shall be supplied with current at the rated voltage and with the connecting lead resistances specified in paragraphs 6.2.3 to 6.2.5 above, and operated respectively:

— 10 000 times for AWDs of class I intended principally for motor cycles with power less than or equal to 7 kW,

— 50 000 times for AWDs [of class II](#) intended principally for vehicles of categories M and N and motor cycles with a power greater than 7 kW, each time for 1 second followed by an interval of 4 seconds. During the test, the AWD shall be ventilated by an air current having a speed of approximately 10 m/sec,

— [\[15\] hours emitting continuously the minimum beeping sound level according 6.2.7.3 \(b\)](#) for [RAWDs of class III](#) and [6.2.7.3 \(a\) for AWDs of class IV](#).

6.3.2. If the test is made in an anechoic chamber, the chamber shall be large enough to ensure normal dispersal of the heat released by the warning device during the test.

6.3.3. The ambient temperature in the testing room shall be between + 15° and + 30 °C.

6.3.4. If, after the AWD has been operated for half the number of times prescribed, the sound-level characteristics are no longer the same as before the test, the AWD may be adjusted. After being operated the prescribed number times, and after further adjustment if necessary, the AWD must pass the test described in paragraph 6.2 above.

6.3.5. For warning devices [of class I and II](#) of the electro-pneumatic type, the device may be lubricated with the oil recommended by the manufacturer after every 10 000 times of operation.

7. MODIFICATION OF THE TYPE OF AUDIBLE WARNING DEVICE AND EXTENSION APPROVAL

7.1. Any modification of the type of audible warning device shall be notified to the administrative department which granted approval to the type of audible warning device. This department may then:

7.1.1. either take the view that the modifications made are not likely to have any appreciable adverse effect;

7.1.2. or call for a new report from the technical service responsible for the tests.

7.2. Notice of confirmation of the approval, with particulars of the modifications, or of refusal of approval shall be communicated to the Parties to the Agreement applying this Regulation, in accordance with the procedure indicated in paragraph 5.4 above.

7.3. The competent authority issuing the extension of approval shall assign a series number to each communication form drawn up for such an extension.

8. CONFORMITY OF PRODUCTION

The conformity of production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2) with the following requirements:

8.1. AWD approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraph 6 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 2 years. EN L 323/38 Official Journal of the European Union 6.12.2011

9. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

9.1. The approval granted to a type of audible warning device pursuant to this Regulation may be withdrawn if the conditions set forth in paragraph 8.1 are not complied with or if the audible warning device fails to pass the checks referred to in paragraph 8.2 above.

9.2. Should a Party to the Agreement applying this Regulation withdraw an approval which it has previously granted, it shall forthwith notify the other Contracting Parties applying this Regulation by means of a copy of the approval form bearing at the end in large letters the statement, signed and dated: 'APPROVAL WITHDRAWN'.

10. PRODUCTION DISCONTINUED

If the holder of an approval granted pursuant to this Regulation discontinues the production of the type of audible warning device approved, he shall inform the authority which granted the approval. Upon receipt of the communication, this authority shall inform the other Parties to the Agreement applying this Regulation by means of a copy of the approval form bearing at the end in large letters the statement, signed and dated: 'PRODUCTION DISCONTINUED'.

II. AUDIBLE SIGNALS OF MOTOR VEHICLES

11. DEFINITIONS

For the purpose of this Regulation,

11.1. 'Approval of the motor vehicle' shall be understood to mean approval of vehicle type with regard to its audible signal;

11.2. 'Vehicle type' shall be understood to mean vehicles not essentially different from another with respect to such matters as:

11.2.1. the number, class(es) and type(s) of warning devices fitted on the vehicle;

11.2.2. the mountings used to fit the warning devices to the vehicle;

11.2.3. the position of the warning devices on the vehicle;

11.2.4. the rigidity of the parts of the structure on which the warning device(s) is (are) mounted;

11.2.5. the shape and materials of the bodywork at the front of the vehicle which might affect the level of the sound emitted by the warning device(s) and have a masking effect.

12. APPLICATION FOR APPROVAL

12.1. The application for approval of a vehicle type with regard to its audible signals shall be submitted by the vehicle manufacturer or by his duly accredited representative;

12.2. It shall be accompanied by the following documents in triplicate giving the following particulars:

12.2.1. a description of the vehicle type with regard to the items mentioned in paragraph 11.2 above;

12.2.2. a list of the components required to identify the warning device(s) that may be mounted on the vehicle;

12.2.3. Drawings indicating the position on the vehicle of the warning device(s) and of its (their) mountings.

12.3. A vehicle representative of the vehicle type to be approved shall be submitted to the technical service responsible for the approval tests.

13. APPROVAL

13.1. If the vehicle type submitted for approval pursuant to this Regulation meets the requirements of paragraphs 14 and 15 below, approval for this vehicle type shall be granted.

13.2. An approval number shall be assigned to each type approved. Its first two digits (at present 00 for the Regulation in its original form) 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 may not assign this number to another vehicle type.

13.3. Notice of approval or of refusal of approval or extension or withdrawal or production definitely 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 2 to the Regulation, and of drawings (supplied by the applicant for approval) with maximum format A4 (210 × 297 mm), or folded to this format, and on an appropriate scale.

13.4. On every vehicle which conforms to a vehicle type approved under this Regulation there shall be affixed conspicuously, in an easily accessible place indicated on the approval form, an international approval mark comprising:

13.4.1. a circle containing the letter 'E' followed by the distinguishing number of the country granting approval,

13.4.2. the number of this Regulation placed to the right of the circle referred to in paragraph 13.4.1.

13.5. If the vehicle conforms to a vehicle type approved, under another (other) Regulation(s) annexed to the Agreement, in the same country as that which has granted the approval under this Regulation, the symbol referred to in paragraph 13.4 need not be repeated; in this case, the additional numbers and symbols of all the Regulations under which approval has been granted in the country which granted the approval under this Regulation shall be set out in vertical columns to the right of the symbol referred to in paragraph 13.4.

13.6. The approval mark must be clearly legible and indelible.

13.7. The approval mark shall be placed near the plate bearing the characteristics of the vehicle and may also be affixed to this plate.

13.8. Annex 3, Section II, to this Regulation gives an example of the arrangement of the approval mark.

13.9. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type approval is granted.

14. SPECIFICATIONS

~~The A vehicle according 1.1 concerning function and properties of its AWDs of class I or II shall comply with the following specifications of 14.1 to 14.8.~~

~~A vehicle according 1.2 concerning function and properties of its **RAWDreverse alarm** shall comply with the following specifications of 14.1 to 14.7 and 14.9 to 14.1410.~~

~~In the case of a single vehicle the installation of a reverse alarm according 1.2 is not necessary⁷ as long as the vehicle is equipped with a camera monitor device for indirect vision according UN R 46 Revision 5 with a camera mounted at the rear of the vehicle.~~

~~In the case of a single vehicle linked with a semi-trailer or trailer the installation of a reverse alarm according 1.2 is not necessary as long as the~~

~~— vehicle is equipped with a camera monitor device for indirect vision according UN R 46 Revision 5 with a camera mounted at the rear of the vehicle~~

~~and~~

~~— semi-trailer or trailer is equipped also with a camera for indirect vision according UN-R 46 Revision 5 at its rear~~

~~and~~

~~— monitor system of the vehicle is capable to show the indirect vision behind the semi-trailer or trailer.;~~

14.1. The audible warning device(s) (or system) fitted on the vehicle shall be of a type approved under this Regulation;

Audible warning devices of Class II approved under this Regulation in its original form, and therefore not bearing the symbol II in their approval mark, may continue to be fitted to vehicle types submitted for approval pursuant to this Regulation.

14.2. The test voltage shall be as specified in paragraph 6.2.3 of the Regulation;

14.3. The sound pressure measurements shall be made in the conditions specified in paragraph 6.2.2 of this Regulation;

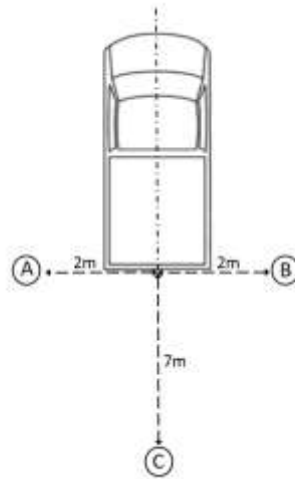
14.4. The A-weighted sound pressure level emitted by the device fitted on the vehicle shall be measured **as follows:**

⁷~~In the case of a non-existing AWD of class III or IV the non-existing of this devices shall not be needed to be approved according to this Regulation.~~

14.4.1. AWDs class I and class II shall be measured at a distance of 7 m in front of the vehicle, the latter being placed on an open site, on ground as smooth as possible and, in the case of devices supplied with direct current, with its engine stopped;

14.4.2. RAWDs class III and class IV shall be measured from the rear plane of the vehicle on A, B, C points as shown in Figure 1

Figure 1



14.5. The microphone of the measuring instrument shall be placed approximately in the mean longitudinal plane of the vehicle;

14.6. The sound pressure level of the background noise and wind noise must be at least 10 dB (A) below the sound to be measured;

14.7. The maximum sound-pressure level shall be sought within the range of 0,5 and 1,5 m above the ground;

14.8. Measured under the conditions specified in paragraphs 14.2 to 14.7, the maximum sound-pressure level (14.7) of the audible signal tested shall be at least:

(a) equal to 83 dB(A) and not more than 112 dB(A) for the signals of motor cycles of a power less than or equal to 7 kW (AWDs of class I);

(b) equal to 93 dB(A) and at most 112 dB(A) for the signals of vehicles of categories M and N and motor cycles of a power greater than 7 kW (AWDs of class II).

14.9. Measured under the conditions specified in paragraphs 14.2 to 14.7, the maximum sound-pressure level (14.7) of the audible signal tested of RAWDs of class III shall be between the limits prescribed in Table 1. at least:

a) equal to 80 dB(A) and not more than 94 dB(A) at sound level „High“;

b) equal to 68 dB(A) and not more than 78 dB(A) at sound level „Normal“;

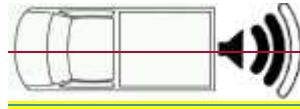
e) equal to 52 dB(A) and not more than 58 dB(A) at sound level „Low“.

Table 1

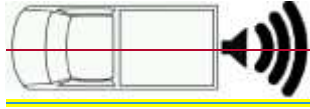
Measurement Positions	Limit Values of Vehicle Categories (dB(A))	
	[N2], [M2], M3	N3
A / B	[74 - 86]	[80 - 92]
C	[64 - 78]	[70 - 84]

14.10. The function “High”, “Normal” and “Low” shall be located so that it is operable by the driver in a normal seating position:

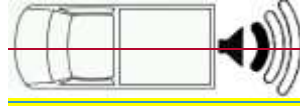
a) — „Normal“



b) „High“



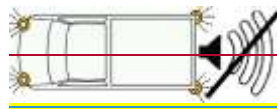
c) „Low“



14.11. Measured under the conditions specified in paragraphs 14.2 to 14.7, the maximum sound-pressure level (14.7) of the audible signal tested of AWDs of class IV shall be at least after measuring the ambient noise level between [50] and [87] dB(A) at the position of the microphone during a period of minimum 5 seconds, the generated sound level shall be [5 dB(A) ± 2] dB(A) higher than the ambient noise level. But the generated sound level shall not exceed [94] dB(A).

14.12. Deactivation of an AWD of class III or class IV by a „Pause switch“ (e.g. to reduce the alarms noise level, during night time operation) is allowed, if it is secured that the use of the „Pause switch“, in combination with the gear selector of the vehicle I reverse, activates automatically the warning hazard lights.

14.13. Deactivation in accordance to 14.12 is shown to driver by following symbol:



14.14. The adjustability of an AWD of class III in accordance to 14.9 to 14.12 and the deactivation according 14.12 has to be designed in such a way, that the sound level „Normal“ is activated automatically after reaching a vehicle speed of 10 km/h + 5 km/h in forward motion or if the engine of the vehicle is started again after each turn off.

15. MODIFICATIONS OF VEHICLE TYPE AND EXTENSION OF APPROVAL

15.1. Any modification of the vehicle type shall be notified to the administrative department which granted approval to the vehicle type. This department may then:

- 15.1.1. either take the view that the modifications made are not likely to have any appreciable adverse effect and that in any case the vehicle still meets the requirements; or
- 15.1.2. call for a new report from the technical service responsible for the tests.

15.2. Notice of confirmation of approval with particulars of the modifications, or of refusal of approval shall be communicated to the Parties to the Agreement applying this Regulation, in accordance with the procedure indicated in paragraph 13.3 above.

15.3. The competent authority issuing the extension of approval shall assign a series number to each communication form drawn up for such an extension.

16. CONFORMITY OF PRODUCTION

The conformity of production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2) with the following requirements:

16.1. A vehicle approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraph 14 above.

16.2. 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 2 years.

17. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

17.1. The approval granted to a vehicle type pursuant to this Regulation may be withdrawn if the conditions set forth in paragraph 16.1 above are not complied with, or if the vehicle fails to pass the checks referred to in paragraph 16.2 above.

17.2. Should a Party to the Agreement applying this Regulation withdraw an approval which it has previously granted, it shall forthwith notify the other Contracting Parties applying this Regulation by means of a copy of the approval form bearing at the end in large letters the statement, signed and dated: 'APPROVAL WITHDRAWN'.

18. NAMES AND ADDRESSES OF THE TECHNICAL SERVICES CONDUCTING APPROVAL TESTS AND OF ADMINISTRATIVE DEPARTMENTS

The Parties to the Agreement applying this Regulation shall communicate to the United Nations Secretariat the names and addresses of the technical services responsible for approval tests and of the administrative departments which grant approval and to which forms certifying approval or refusal or withdrawal of approval, issued in other countries, are to be sent. EN L 323/42 Official Journal of the European Union 6.12.2011

ANNEX 1
COMMUNICATION
(Maximum format: A4 (210 × 297 mm))



issued by: Name of administration

.....
.....
.....

Communication concerning the approval (or refusal or withdrawal of approval or production definitely discontinued) of a type of audible warning device for motor vehicles pursuant to Regulation No. 28

1. Trade name or mark
2. Type (electro-pneumatic, electro-magnetic with resonator disc, electromagnetic horn, etc .) indicating whether it is a single-tone or multiple-tone warning device
3. Manufacturer's name and address.....
4. If applicable, name and address of manufacturer's representative.....
5. Brief description of warning devices
6. Supply voltage(s) volts */.....
7. Rated operating pressure(s) kg/cm² */.....
8. Rated frequency (or frequencies) Hz */.....
9. Geometrical characteristics (internal length and diameter) of connecting line between compressor or control and the audible warning device.....
10. Submitted for approval on.....
11. Technical service responsible for conducting approval tests.....
12. Date of report issued by that service.....
13. Number of report issued by that service
14. Approval granted/refused */.....
15. Place.....
16. Date.....
17. Signature.....
18. The following documents bearing the approval number shown above are annexed to this communication:.....
drawings, diagrams and plans of the warning device; ... photographs.

*/ Strike out whatever does not apply.

¹⁾ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation). The proportions and dimensions in accordance with Annex 3.

ANNEX 2
COMMUNICATION
(Maximum format: A4 (210 × 297 mm))



issued by: Name of administration

.....
.....
.....

Communication concerning the approval (or refusal or withdrawal of approval or production definitely discontinued) of a type of audible warning device for motor vehicles pursuant to Regulation No. 28

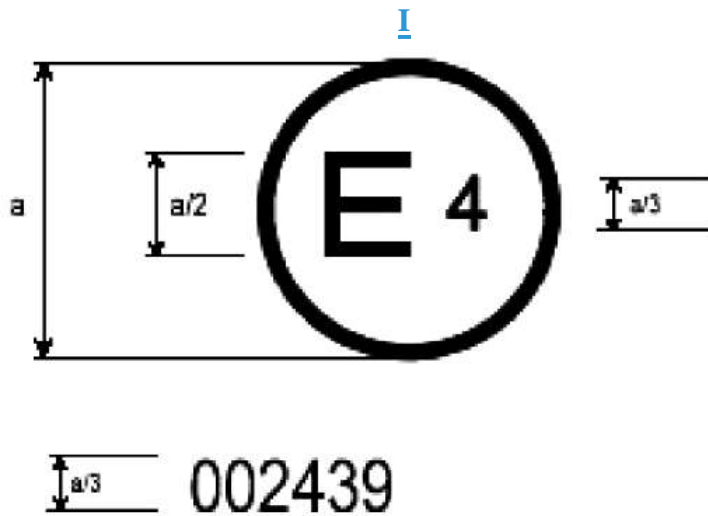
1. Trade name or mark of the vehicle.....
2. Vehicle type.....
3. Manufacturer's name and address.....
4. If applicable, name and address of manufacturer's representative.....
5. Type(s) of warning device(s) */.....
6. Power supply used: Vehicle battery only/Battery with vehicle engine at idle/External power supply**/
7. Sound level values:.....
8. Submitted for approval on.....
9. Technical service responsible for approval tests.....
10. Date of report issued by that service.....
11. Number of report issued by that service.....
12. Approval granted/refused **/.....
13. Place.....
14. Date.....
15. Signature.....
16. The following documents are annexed to this communication: drawings of the mountings of the warning device(s), ... drawings and diagrams giving the mounting positions and characteristics of the parts of the structure on which the devices are fitted. ... over-all views of the front of the vehicle and of the compartment in which the device is situated and description of the component materials..... */ Indicate the approval numbers. A list of documents contained in the approval file transmitted to the administrative service which has granted approval is annexed to this communication.

**/ Strike out what does not apply.

ANNEX 3

I. ARRANGEMENT OF THE APPROVAL MARK OF THE AUDIBLE WARNING DEVICE

(see paragraph 5.5 of this Regulation)



$a = 8 \text{ mm min.}$

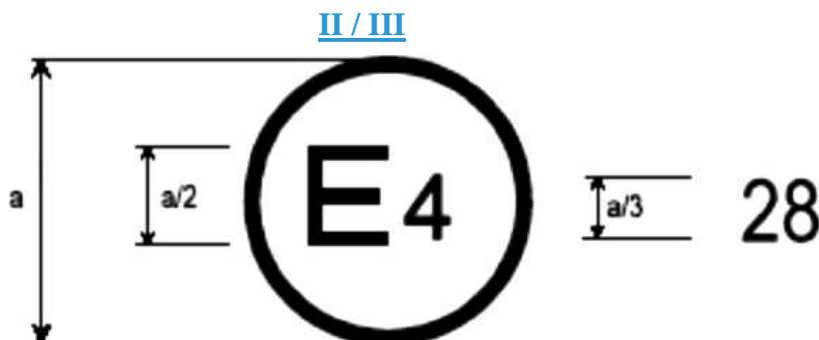
The above approval mark affixed to an audible warning device shows that this AWD of Class I has been approved in the Netherlands (E 4) under approval number 002439. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No 28 in its original form.

Note: The approval number must be placed close to the circle and must be in a position either above or below the letter 'E' or to left or right of that letter. The digits of the approval number must be on the same side of the letter 'E' and face in the same direction. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

II. ARRANGEMENT OF THE APPROVAL MARK OF A VEHICLE WITH REGARD TO ITS AUDIBLE SIGNALS

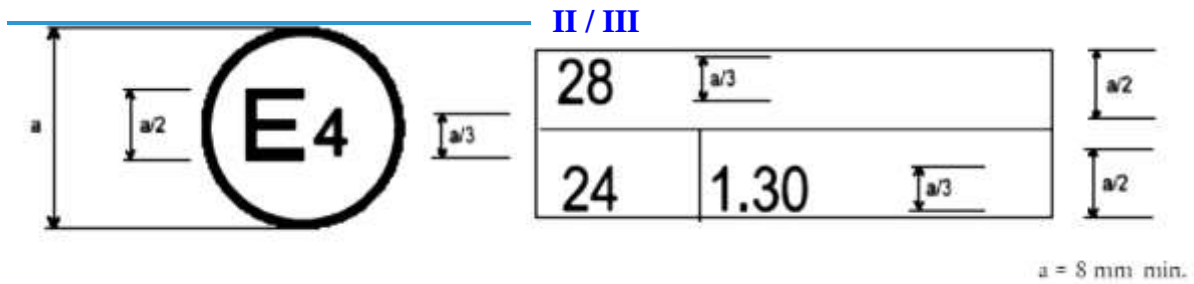
(see paragraph 13.4 of this Regulation)

MODEL A



$a = 8 \text{ mm min.}$

The above approval mark affixed to a vehicle indicates that, pursuant to Regulation No 28, this vehicle type has been approved in the Netherlands (E 4), with regard to its audible signals [according to class II \(horn\) and III \(reverse alarm\)](#).

MODEL B

The above approval mark affixed to a vehicle indicates that, pursuant to Regulation Nos 24 and 28, this vehicle type has been approved in the Netherlands (E 4), with regard to its audible signals [according to class II \(horn\) and III \(reverse alarm\)](#) and to emissions of pollutants by the Diesel engine. In the case of the latter Regulation, the corrected value of the absorption factor is $1,30 \text{ m}^{-1}$.

Justifications

WP29 has requested from the GRB to evaluate the document WP29-168-04, which was submitted by Turkey at WP29 168th session of 8-11 March 2016, about *Establishment of New Regulation for Reversing Audible Warning Devices.*

Germany proposed a further recommendation on the topic, suggesting GRB-64-05, which is automatically adjustment and selectable levels of reversing audible warning device at GRB 64th session of 5-7 September 2016.

In the first phase of the recommendation, it was anticipated that this adjustment will be made with the manual switch from the driver position. According to the proposal there are three different dB(A) for each sound level (Normal Level, High Level, Low Level). The recommendation closely resembles the “headlamp leveling concept” in UN/ECE Regulation No 48.

In Regulation No 48, through the improvement stages of the text, at first, the headlamp leveling device has been manually adjusted by the driver, but with the development of technology it has become an automatic headlamp leveling application. Similar typology can be seen in the proposal GRB-64-05.

At the Headlamp leveling case, the driver was able to adjust for the need of more clear and fine sight. But in this case the driver is expected to make this adjustment with the responsibility of detecting and protecting the third party (pedestrians, children etc.) It is anticipated that this acceptance will not be applied in practice and that the sound level will probably remain at a constant level.

On the other hand, categories of vehicles show the usage area of the vehicles. As a result, category-based noise level adjustment will be more accurate instead of adjustment with manual switch. Vehicles standard horn has a fixed volume level, independent of external noise, and so far there has been no problem.

Also, manual switch proposal in GRB-64-05 requires much more time to be applied and will not be for the advantage of the sector from the point of the cost-benefit ratio.

Additional explanation: The phases of the GRB-64-05 proposal can be seen at the table below.

<u>Low Level</u>	<u>52-58 dB(A)</u>
<u>Normal Level</u>	<u>68-78 dB(A)</u>
<u>High Level</u>	<u>80-94 dB(A)</u>

In this context, as N3 category vehicles must make enough noise to be heard in loud places such as construction sites, it will be suitable to be limited to 70-84 dB (A) by considering that they are often driven in urban areas. However, the category of N2, M2 and M3 vehicles will be suitable for urban areas, which are expressed as "Normal Level" at 64 to 78 dB (A) in the dB range recommended in GRB-64.05.

“Low level”, “Night switch off” and “Rear-View-Camera” options eliminate the need for instantaneous recognition, which is the general principle for reverse gear audio warning. For this reason, it is necessary to focus on the benefits of the preventing accidents with this

reversing audio warning system instead of causing disturbance by making noise in a quiet environment. These changes also correspond with UN/ECE Regulation No 138.01 series proposal (ECE/TRANS/WP.29/GRB/2016/9).

Also, as indicated in WP29-168-04 document, according to statically evidences accidents involving death or personal injury while reversing have increased in recent years. In addition, accidents involving death or personal injury occurs more in M2 categories than M3, N2, N3 categories.

M2 category vehicles are very common for service and tourism business usage in Turkey and reverse audible warning devices are a type approval requirement for M2 category vehicles besides M3, N2, N3 category vehicles. Therefore M2 category vehicles can be included into this regulation to harmonize a standard for system.

The noise limit values in Table 1 measured from 7 m away from the vehicle. In addition, as in UN/ECE Regulation No 138, measurements are taken from 2 m away from both sides of the vehicle for making sure that the pedestrians on the roadside, sidewalks are adequately warned.

Table 1

<u>Measurement Positions</u>	<u>Limit Values of Vehicle Categories (dB(A))</u>	
	<u>[N2], [M2], M3</u>	<u>N3</u>
<u>A / B</u>	<u>[74 – 86]</u>	<u>[80 – 92]</u>
<u>C</u>	<u>[64 – 78]</u>	<u>[70 – 84]</u>