
Electrically propelled road vehicles - Airborne acoustical noise of vehicle during charging with on-board chargers - Determination of sound power level

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Elektrisch angetriebene Straßenfahrzeuge - Luftschallemission von Fahrzeugen während der Ladung mit bordeigenen Ladegerät - Bestimmung des Schall-Leistungspegels

Véhicules routiers a propulsion électrique - Bruit acoustique aérien du véhicule pendant la charge avec des chargeurs embarqués - Détermination du niveau de puissance acoustique

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ICS:

17.140.30	Emisija hrupa transportnih sredstev	Noise emitted by means of transport
43.120	Ò\ dã } æ&• ç æç [: æ	Electric road vehicles

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English version

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This European Standard was approved by CEN on 14 October 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document has been prepared by CEN /TC 301, "Electrically propelled road vehicles", the secretariat of which is held by AFNOR.

This document has to be implemented at national level, either by publication of an identical text or by endorsement, by June 2002, and conflicting national standards have to be withdrawn by June 2002.

Annex A is for information only.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this document: Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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EN 12736:2002 (E)**Introduction**

Electric road vehicles emit a very low level of noise when being driven because the noise emission of the electric motor is negligible compared with that of an Internal Combustion (I.C.) engine. On the other hand, electric road vehicles emit noise when they are stationary and the battery is on charge. If an electric road vehicle is equipped with an on-board charger, this can be a source of noise during charging, together with a number of other components which may also be operating and producing noise. Such airborne noise should be minimised, to avoid public nuisance, and its intensity should be no higher than that permitted under existing limits or recommendations.

This is the reason why it is important to measure the noise emission of the whole vehicle under precisely defined conditions. The airborne acoustical noise emission is expressed in terms of the sound power level of the electric road vehicle.

1 Scope

This standard specifies the procedure for measurement of the airborne acoustical noise emissions of electrically propelled road vehicles from category M₁, M₂, N₁, or N₂¹⁾ during charging, the vehicle being fitted with an on-board charger.

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2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN ISO 3744: 1995, *Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)*.

ISO 362: 1998, *Acoustics - Measurement of noise emitted by accelerating road vehicles - Engineering method*.

ISO 1176:1990, *Road vehicles - Masses - Vocabulary and codes*.

ISO 10844:1994, *Acoustics - Specification of test tracks for the purpose of measuring noise emitted by road vehicles*.

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1**complete vehicle kerb mass VKM**

the definition of ISO-M06 in accordance with ISO 1176 applies.

NOTE The complete vehicle kerb mass VKM includes, in addition to the definition of ISO 1176, the traction battery, on board charger, portable charger or part of it if provided as standard by the manufacturer of the vehicle.

¹⁾ Categories of vehicles M₁, M₂, N₁ and N₂ are defined in Directive 92/53 EEC

4 Preconditioning of the vehicle

4.1 Before the test, the battery of the vehicle shall be discharged to a level of at least 50 % of discharge, as indicated by the state of charge meter in the vehicle. If there is no state of charge meter fitted to the vehicle, the battery shall be discharged to a level of at least 50 % depth of discharge by driving the vehicle over a distance and at a speed, which are determined by the vehicle manufacturer.

4.2 The vehicle tyres shall be inflated to the pressure specified by the vehicle manufacturer when the tyres are at the ambient temperature, thus keeping the vehicle stable on the test track.

5 Preparation of vehicle

5.1 The test shall be carried out with the vehicle at its VKM according to ISO 1176.

5.2 The vehicle on board charger shall be connected to the mains electricity supply.

5.3 The test shall be carried out for worst case conditions; the vehicle manufacturer shall guarantee that all devices capable of influencing the test result are in operation. Exception may be made for devices capable of operating for no more than 5 min in any period of 1 h; these may be switched off. If there are devices in the vehicle which cannot operate concurrently, the device with the largest influence on the test result shall operate. All devices shall operate at their normal operating power level.

6 Acoustical environment

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6.1 Test site

The test site shall be a track as defined in ISO 10844.

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6.2 Background noise

The background noise shall be at least 10 dB below the noise emitted by the vehicle under test.

6.3 Environmental conditions

The ambient temperature shall be between 0 °C and 42 °C. It is recommended not to perform the measurements if the wind speed exceeds 5 m/s at the height of the microphone.

7 Acoustical measurement device

The acoustical measurement device shall conform to the specifications defined in 5.1 in ISO 362:1998.

8 Operation mode

8.1 Position of microphones

The vehicle is located at the centre of the track defined in ISO 10844.

The microphone is located 2 m from the vehicle, 1,2 m above the ground for the six following positions:

- at the front and in the symmetry plane of the vehicle;
- at the rear and in the symmetry plane of the vehicle;
- respectively on the right and left sides and in the plane crossing the foremost axles;

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— respectively on the right and left sides and in the plane crossing the rear axles.

8.2 Duration of measurement

It shall conform to the minimum values given in 7.5.3 in EN ISO 3744:1995.

8.3 Reading

For each position, the total A-weighted sound power level shall be recorded. Only the highest value of the six readings shall be reported, in a similar manner as described in ISO 362.

9 Test report

The following data shall be recorded in the test report.

9.1 Data of the test vehicle**9.1.1 Trade name or mark of the vehicle****9.1.2 Battery****9.1.2.1 Trade name and type of the battery****9.1.2.2 Nominal voltage****9.1.3 Charger****9.1.3.1 Trade name and type of the charger****9.1.3.2 Voltage****9.1.3.3 Maximum power****9.2 Test site and ambient conditions****9.2.1 Ambient temperature****9.2.2 Barometric pressure****9.2.3 Relative humidity****9.3 Measuring instrument description****9.4 A-weighted background noise pressure level****9.5 Readings of the sound pressure levels with the vehicle, expressed in dB(A)**

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