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**Acoustics — Method for measuring
the influence of road surfaces on
traffic noise —**

**Part 4:
SPB method using backing board**

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*Acoustique — Méthode de mesurage de l'influence des revêtements de
chaussées sur le bruit émis par la circulation —
Partie 4: Méthode SPB avec utilisation de panneau*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/PAS 11819-4 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

ISO/PAS 11819 consists of the following parts, under the general title *Acoustics — Measurement of the influence of road surfaces on traffic noise*:

- *Part 1: Statistical pass-by (SPB) method*
- *Part 2: Close-proximity (CPX) method*
- *Part 3: Reference tyres* [Technical Specification]
- *Part 4: SPB method using backing board* [Publicly Available Specification]

Introduction

ISO 11819-1 specifies a method for measuring the acoustic quality of roads called the statistical pass-by (SPB) method. Owing to severe requirements on the acoustical environment at the measurement site, the method cannot generally be used at any arbitrary location.

This part of ISO 11819 complements ISO 11819-1 for applications in situations where the test conditions cannot be met — such as when there may be a potential influence of acoustic reflections from the rear of the measurement position. However, it must be recognized that there will be a reduction in the accuracy of the results in comparison to a true free-field measurement.

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Acoustics — Method for measuring the influence of road surfaces on traffic noise —

Part 4: SPB method using backing board

1 Scope

This part of ISO 11819 specifies a modified version of the statistical pass-by (SPB) method given in ISO 11819-1 that uses a microphone mounted on a backing board instead of a microphone in normal, free-field conditions. It is applicable to measurements taken in an urban, built-up, environment or in the presence of safety barriers, noise barriers, embankments or road cuttings.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11819-1, *Acoustics — Measurement of the influence of road surfaces on traffic noise — Part 1: Statistical pass-by (SPB) method*

ISO 1996-2, *Acoustics — Description, measurement and assessment of environmental noise — Part 2: Determination of environmental noise levels*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11819-1 and the following apply.

3.1

backing board

rectangular, hard, reflective board on which a microphone is mounted

3.2

conventional microphone

free-field or pressure microphone

3.3

surface microphone

flush-mounted microphone designed to measure sound pressure on a surface without requiring the drilling of a hole through it

4 Measurement principle

The principle is the same as for ISO 11819-1, except that the microphone is mounted on a backing board rather than being used in normal free-field conditions.

By mounting the microphone membrane very close to the backing board during measurements, noise from behind (for example, reflections from facades or noise barriers) is suppressed. The noise coming from the front is reflected by the backing board in a controlled way so that it can be taken into account by applying a correction to the measured value. In principle, the A-weighted sound pressure level increases by 6 dB due to a doubling of the sound pressure caused by the backing board.

5 Apparatus

5.1 General

The same measuring instruments as for the SPB method shall be used.

Alternatively, a surface microphone may be used.

5.2 Backing board

5.2.1 Dimensions

The backing board shall have a rectangular shape.

The width shall be 900 mm \pm 10 mm and the height 750 mm \pm 10 mm (see [Figure 1](#)).

5.2.2 Position

The backing board shall be oriented parallel to the road and 7,50 m \pm 0,10 m from the centre of the road lane that is the subject of the measurement.

5.2.3 Material

The board shall be acoustically hard and at least 15 mm thick to avoid vibration.^[1]

If metal is used, the properties shall satisfy ISO 1996-2.

The mass of the board shall be at least 14 kg/m² (Reference^[2]).

NOTE 1 In tests made prior to publication of this part of ISO 11819, medium-density fibre board was used and worked well.

NOTE 2 More information about material properties is available in ISO 1996-2.

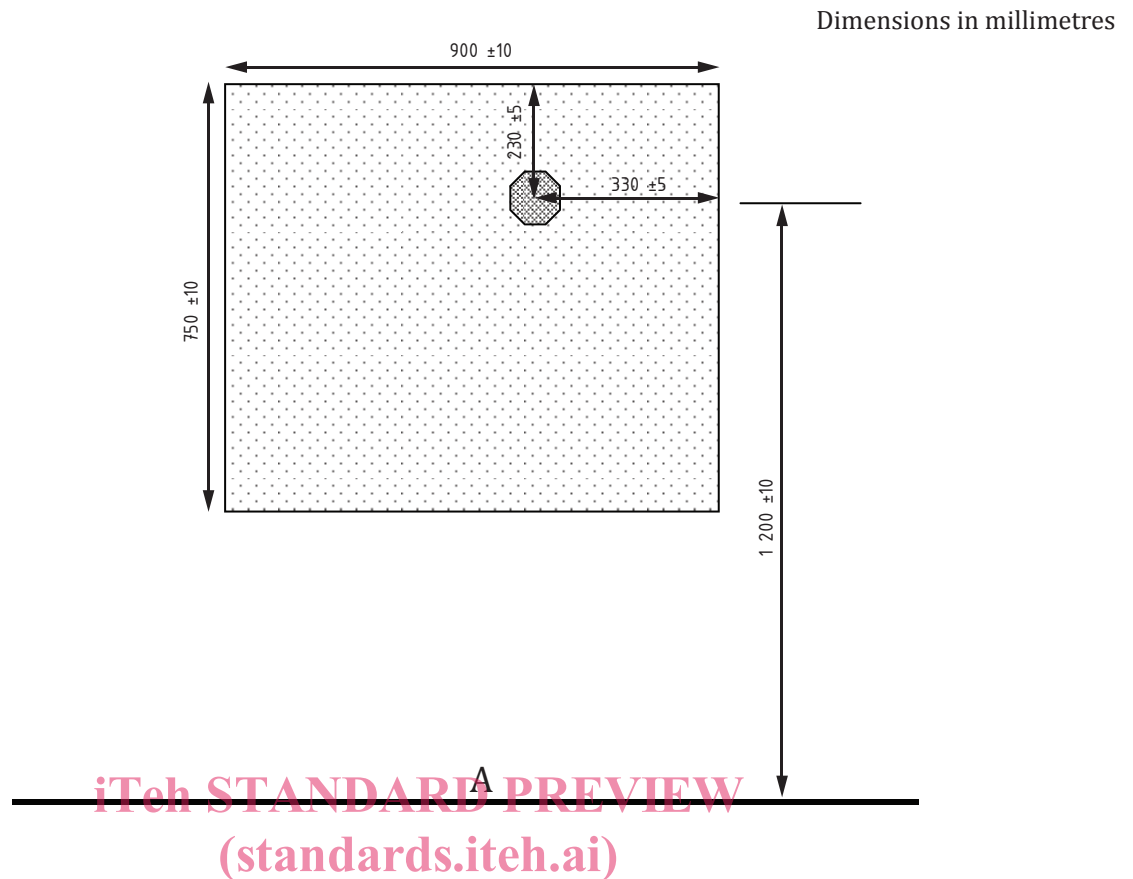
5.3 Microphone

5.3.1 Position

The microphone shall be located in the same position relative to the road as for the SPB method according to ISO 11819-1. To achieve this, the position of the backing board is set with respect to the microphone.

In order to minimize the effect of diffraction with constructive interference at the edges, position the microphone away from the centre of the board and from the board's diagonals and centrelines. Mount the microphone in the upper right-hand corner of the board, 330 mm \pm 5 mm from the right-hand edge and 230 mm \pm 5 mm from the upper edge (see [Figure 1](#)).^[4]

Microphones having a diameter greater than 12,7 mm (1/2 inch) shall not be used.

**Key**

- A road reference level according to ISO 11819-1
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Figure 1 — Backing-board dimensions and microphone position as seen from sound source (independent of traffic direction)

5.3.2 Mountings

The following microphone mountings are permitted:

- the microphone mounted as close as practicable to the board, with the casing touching the board if feasible (microphone casing parallel to the board),
- a surface microphone mounted flush with the surface of the board.

[Figure 2](#) shows a close-up view of the mounting.