
**Acoustics — Measurement of the influence
of road surfaces on traffic noise —**

**Part 1:
Statistical Pass-By method**

*Acoustique — Mesurage de l'influence des revêtements de chaussées sur
le bruit émis par la circulation —*

Partie 1: Méthode statistique au passage

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Foreword

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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.

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

ISO 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 method*
- *Part 2: Close-proximity method*

Annexes A to F of this part of ISO 11819 are for information only.

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Introduction

The emission and propagation of road traffic noise greatly depend on road surface characteristics, notably on texture and porosity. Both these characteristics influence the generation of tyre/road noise and, in addition, the porosity can influence the propagation of sound, particularly when the propagation takes place close to the surface. Power unit noise, which is usually generated at a greater height above the road surface than tyre/road noise, may also be affected during propagation by the porosity characteristics of the road surface. These effects lead to differences in sound levels, associated with a given traffic flow and composition, from different road surfaces of up to 15 dB, which can have a substantial impact on the environmental quality alongside a road.

It is therefore important to be able to measure this influence by a standardized method and to arrive at a quantitative ranking of road surfaces with respect to traffic noise. This part of ISO 11819 offers such a method, the objective of which is to satisfy a need expressed by road planners, road administrators, contractors, manufacturers of so-called "low-noise surfaces" and by other parties concerned with the prediction and control of road traffic noise.

Acoustics — Measurement of the influence of road surfaces on traffic noise —

Part 1: Statistical Pass-By method

1 Scope

This part of ISO 11819 describes a method of comparing traffic noise on different road surfaces for various compositions of road traffic for the purpose of evaluating different road surface types. Sound levels representing either light or heavy vehicles at selected speeds are assigned to a certain road surface. The method is applicable to traffic travelling at constant speed, i.e. free-flowing conditions at posted speeds of 50 km/h and upwards. For other driving conditions where traffic is not free-flowing, such as at junctions and where the traffic is congested, the road surface is of less importance.

A standard method for comparing noise characteristics of road surfaces gives road and environment authorities a tool for establishing common practices or limits as to the use of surfacings meeting certain noise criteria. However, it is not within the scope of ISO 11819 to suggest such criteria.

The Statistical Pass-By (SPB) method is intended to be used essentially for two main purposes. First it may be used to classify surfaces in typical and good condition as a type according to their influence on traffic noise (surface classification) and, secondly, it may be used to evaluate the influence on traffic noise of different surfaces at particular sites irrespective of condition and age. This latter type of application may be useful for example where a road is to be resurfaced and "before" and "after" measurements are required in order to assess the differences in traffic noise following resurfacing. However, due to severe requirements on the acoustical environment at the site, the method cannot generally be used for approval of works at any given site.

Clause 4 gives a general description of the SPB method.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 11819. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 11819 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 10844:1994, *Acoustics — Test surface for road vehicle noise measurement*.

ISO 13473-1:1997, *Acoustics — Characterization of pavement texture using surface profiles — Part 1: Determination of mean profile depth*.

IEC 60651:1979, *Sound level meters*.

IEC 60942:1988, *Sound calibrators*.

IEC 61260:1995, *Electroacoustics — Octave-band and fractional-octave-band filters*.

3 Definitions

For the purposes of this part of ISO 11819, the following definitions apply.

3.1 Traffic noise, vehicle noise, tyre/road noise and power unit noise

3.1.1 traffic noise

overall noise emitted by the traffic running on the road under study

3.1.2 vehicle noise

total noise from an individual vehicle, the two major components of which are power unit noise (3.1.4) and tyre/road noise (3.1.3)

3.1.3 tyre/road noise

noise generated by the tyre/road interaction

3.1.4 power unit noise

noise generated by the vehicle engine, exhaust system, air intake, fans, transmission, etc.

3.2 Statistical Pass-By (SPB) method

measurement procedure designed to evaluate vehicle and traffic noise generated on different sections of road surface under specific traffic conditions

NOTE — The measurements are taken from a great number of vehicles operating normally on the road. Results obtained using this procedure are normalized to standard speeds according to the category or type of road being considered.

3.3 Road speed categories

Three categories of roads are defined with respect to the range of speeds at which the traffic flows and these are usually associated with certain areas (urban, suburban, rural, etc.).

3.3.1 “low” road speed category

conditions which relate to traffic operating at an average speed of 45 km/h to 64 km/h

NOTE — These conditions are usually associated with urban traffic.

3.3.2 “medium” road speed category

conditions which relate to traffic operating at an average speed of 65 km/h to 99 km/h

NOTE — These conditions are mostly found in suburban areas or on rural highways.

3.3.3 “high” road speed category

conditions which relate to cars operating at an average speed of 100 km/h or more; heavy vehicles may operate at lower average speed due to speed restrictions

NOTE — These conditions are usually associated with motorway traffic in rural or suburban areas.