PD CEN/TS 16272-7:2015

BSI Standards Publication

Railway applications — Track — Noise barriers and related devices acting on airborne sound propagation — Test method for determining the acoustic performance

Part 7: Extrinsic characteristics — In situ values of insertion loss

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee RAE/2, Railway Applications - Track.

The UK committee draws users' attention to the distinction between normative and informative elements, as defined in Clause 3 of the CEN/CENELEC Internal Regulations, Part 3.

Normative: Requirements conveying criteria to be fulfilled if compliance with the document is to be claimed and from which no deviation is permitted.

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When speeds in km/h require unit conversion for use in the UK, users are advised to use equivalent values rounded to the nearest whole number. The use of absolute values for converted units should be avoided in these cases. Please refer to the table below for agreed conversion figures.

INS, RST and ENE speed conversions	
km/h	**mph**
5	3
100	60
200	125

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Railway applications - Track - Noise barriers and related devices acting on airborne sound propagation - Test method for determining the acoustic performance - Part 7: Extrinsic characteristics - In situ values of insertion loss

Applications ferroviaires - Voie - Dispositifs de réduction du bruit - Méthode d'essai pour la détermination des performances acoustiques - Partie 7 : Caractéristiques extrinsèques - Valeurs in situ de la perte par insertion

Bahnanwendungen - Oberbau - Lärmschutzwände und verwandte Vorrichtungen zur Beeinflussung der Luftschallausbreitung - Prüfverfahren zur Bestimmung der akustischen Eigenschaften - Teil 7: Fremdspezifische Merkmale - In-situ-Werte zur Einfügungsdämpfung

This Technical Specification (CEN/TS) was approved by CEN on 17 August 2015 for provisional application.

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (CEN/TS 16272-7:2015) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

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

This Technical Specification is one of the series EN 16272, *Railway applications — Track — Noise barriers and related devices acting on airborne sound propagation — Test method for determining the acoustic performance*, as listed below:

— *Part 1: Intrinsic characteristics — Sound absorption in the laboratory under diffuse sound field conditions*;

— *Part 2: Intrinsic characteristics — Airborne sound insulation in the laboratory under diffuse sound field conditions*;

— *Part 3-1: Normalized railway noise spectrum and single number ratings for diffuse field applications*;

— *Part 3-2: Normalized railway noise spectrum and single number ratings for direct field applications*;

— *Part 4: Intrinsic characteristics — In situ values of sound diffraction under direct sound field conditions* [currently at Enquiry stage];

— *Part 5: Intrinsic characteristics — In situ values of sound reflection under direct sound field conditions*;

— *Part 6: Intrinsic characteristics — In situ values of airborne sound insulation under direct sound field conditions*;

— *Part 7: Extrinsic characteristics — In situ values of insertion loss* [the present document].

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The purpose of insertion loss measurements is to have an indication of the "efficiency" of the complete installation in attenuating noise from a technical point of view, *as is usually done with calculations.* The insertion loss is not intended to compare products; in fact, it is site-dependent, so that the same product may give different results when installed on different sites.

In order to be representative, these measurements need to be done in well-defined conditions regarding:

— the noise source (number and type of trains, speed, etc.);

— the meteorological window;

— the measurement time;

— the reference time, i.e. the time over which the measured insertion loss is evaluated based on the measurement results.

When it is not possible to carry out measurements before the construction of the noise barrier, an "equivalent" site is used for the "before" measurements.

The assessment of insertion loss limiting values is out of the scope of this Technical Specification.

1 Scope

This Technical Specification specifies methods for the determination of insertion loss of outdoor noise barriers intended to shield railway noise. It specifies detailed procedures for *in situ* measurement of barrier insertion loss including microphone positions, source conditions and acoustic environments of the measurement sites.

This Technical Specification allows one to measure the insertion loss of a given noise barrier at a given site including given meteorological conditions. It does not make it possible to compare insertion loss values of an equivalent barrier at a different site. It can be used for comparing insertion loss values of different types of barriers at the same site under given meteorological conditions by the "direct method".

This Technical Specification gives a method for determining insertion loss:

a) from the level difference before and after the installation of noise barriers (the "direct method");

b) when the direct method is not applicable, because a barrier has already been installed, using an "indirect method" to estimate the sound pressure levels before installation of the barrier by measurement at another site which has been judged to be equivalent.

For equivalent sites, a close match is required in source characteristics, microphone locations, terrain profiles ground surface characteristics, surrounding artificial structures and meteorological conditions. This Technical Specification prescribes principles for ensuring that sufficiently equivalent conditions are maintained between "before" and "after" cases to permit certain, reliable and repeatable determination of barrier insertion loss.

This Technical Specification does not cover the determination of the intrinsic acoustic characteristics of the barrier, for example the sound insulation index and the sound absorption coefficient.

The equivalent continuous A-weighted sound pressure level and one-third-octave band sound pressure level are used as noise descriptors.

This Technical Specification can be used for routine determination of barrier performance or for engineering or diagnostic evaluation. It can be used in situations where the barrier is to be installed or has already been installed.

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.

EN 60942, *Electroacoustics — Sound calibrators (IEC 60942)*

EN 61260, *Electroacoustics — Octave-band and fractional-octave-band filters (IEC 61260)*

EN 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications (IEC 61672-1)*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*