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Acoustic properties of building elements and of buildings - Laboratory measurement of airborne and structure borne sound from building equipment - Part 1: Simplified cases where the equipment mobilities are much higher than the receiver mobilities, taking wirlpool baths as an example

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NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W **NSAI.ie**

Sales:
T +353 1 857 6730
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NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15657-1

June 2009

ICS 91.120.20

English Version

Acoustic properties of building elements and of buildings - Laboratory measurement of airborne and structure borne sound from building equipment - Part 1: Simplified cases where the equipment mobilities are much higher than the receiver mobilities, taking wirlpool baths as an example

Propriétés acoustiques des éléments de construction et des bâtiments - Mesurage en laboratoire des bruits aériens et de structure des éléments de construction - Partie 1: Cas simplifiés prenant comme exemple les bains bouillonnants

Akustische Eigenschaften von Bauteilen und von Gebäuden - Messung des Luft- und Körperschalls von haustechnischen Anlagen im Prüfstand - Teil 1: Vereinfachte Fälle, in denen die Admittanzen der Anlagen wesentlich höher sind als die der Empfänger am Beispiel von Whirlwannen

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Foreword

This document (EN 15657-1:2009) has been prepared by Technical Committee CEN/TC 126 “Acoustic properties of building elements and of buildings”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

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.

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Introduction

This European Standard, prepared by CEN/TC 126/WG 7, specifies methods for the measurement of airborne and structure borne sound produced by building equipment under laboratory conditions. It is the task of WG 7 to prepare laboratory test methods to determine the source characteristics, while WG 2 concentrates on the method predicting the airborne and structure-borne sound pressure levels produced in the buildings; the prediction method, described in document EN 12354-5, is based on power flow considerations and uses the laboratory test results as input data. The link to WG 2 is explained in more details in an informative annex (Annex B).

The quantities considered in this standard are the following:

a) the airborne sound is characterized by the airborne sound power radiated by the equipment; this power is calculated from the airborne sound measured in a test room in which the equipment is mounted;

b) the structure-borne sound is characterized by the structural power injected by the equipment to the receiving structure to which the equipment is connected; since, in general, the equipment is connected up to three building elements (two walls and one floor), a three plate test rig is used and three structural power components are determined, calculated from vibration velocities measured on the plates.

When the equipment is mounted on low mobility structures (having point mobilities much lower than the mobilities measured on the equipment), the coupling between the source and the receiving structure is simpler and the way of transforming the power components measured in laboratory into the power components injected *in situ* to the building elements, greatly simplified. This first part (part 1) of the standard is restricted to these simplified cases; a second part (part 2) applicable to the other cases will be a future task of WG 7 and is not available yet.

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1 Scope

Part 1 of this European Standard shall apply to any source –receiver configuration where the receiver mobility is 10 dB below the source mobility (see definition of mobility in Clause 3 below). However, part 1 is restricted for the moment to whirlpool baths since only this type of building equipment has been experimentally studied so far; for other types of building equipment, the principle of the method is still valid, but some details in the standard might not be relevant.

Therefore, this first part:

— specifies methods for the measurement under laboratory conditions of airborne and structure borne sound produced by whirlpool baths connected to low mobility structures; for the case of whirlpool baths, building structures of mass per unit area equal or greater than 220 kg/m^2, hollow elements excluded, are considered as low mobility elements;

— defines the expression of the results, including data for comparison between products (single value descriptors) and input data for the prediction method (link to EN 12354-5 explained in Annex B).

2 Normative references

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

EN ISO 140-1:1997, *Acoustics – Measurement of sound insulation in buildings and of building elements – Part 1: Requirements for laboratory test facilities with suppressed flanking transmission (ISO 140-1:1997)*

EN ISO 140-3:1995, *Acoustics – Measurement of sound insulation in buildings and of building elements – Part 3: Laboratory measurements of airborne sound insulation of building elements (ISO 140-3:1995)*

EN ISO 3741:1999, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Precision methods for reverberation rooms (ISO 3741:1999)*

EN ISO 10848-1:2006, *Acoustics – Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms – Part 1: Frame document (ISO 10848-1:2006)*

ISO 5348:1998, *Mechanical vibration and shock – Mechanical mounting of accelerometers*

ISO 7626-1:1986, *Vibration and shock – Experimental determination of mechanical mobility – Part 1: Basic definitions and transducers*

ISO 7626-2:1990, *Vibration and shock – Experimental determination of mechanical mobility – Part 2: Measurements using single-point translation excitation with an attached vibration exciter*

ISO 16063-21:2003, *Methods for the calibration of vibration and shock transducers – Part 21: Vibration calibration by comparison to a reference transducer*

3 Terms and definitions

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

3.1
specimen
object of tests according to this European Standard
active building component (to be connected to building structures)

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