

STN	Akustické vlastnosti stavebných konštrukcií a budov Laboratórne meranie zvuku prenášaného konštrukciou (štruktúrného zvuku) z technických zariadení budov pre všetky podmienky inštalácie	STN EN 15657 73 0539
------------	--	--

Acoustic properties of building elements and of buildings - Laboratory measurement of structure-borne sound from building service equipment for all installation conditions

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 12/17

Obsahuje: EN 15657:2017

Oznámením tejto normy sa ruší
STN EN 15657-1 (73 0539) z decembra 2009

125776

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2018
Podľa zákona č. 264/1999 Z. z. o technických požiadavkách na výrobky a o posudzovaní zhody a o zmene a doplnení niektorých zákonov v znení neskorších predpisov sa slovenská technická norma a časti slovenskej technickej normy môžu rozmnožovať alebo rozširovať len so súhlasom slovenského národného normalizačného orgánu.

EUROPEAN STANDARD

EN 15657

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2017

ICS 91.120.20

Supersedes EN 15657-1:2009

English Version

Acoustic properties of building elements and of buildings - Laboratory measurement of structure-borne sound from building service equipment for all installation conditions

Propriétés acoustiques des éléments de construction et
des bâtiments - Mesurage en laboratoire des bruits
structuraux des équipements de bâtiment pour toute
condition d'installation

Akustische Eigenschaften von Bauteilen und von
Gebäuden - Messung des Körperschalls von
haustechnischen Anlagen im Prüfstand für alle
Installationsbedingungen

This European Standard was approved by CEN on 11 May 2017.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents		Page
European foreword		4
Introduction		5
1	Scope	6
2	Normative references	6
3	Terms and definitions	7
4	Frequency range of measurement	9
5	Installed power determination	9
6	Direct measurement of source quantities	11
6.1	Source free velocity squared measurement	11
6.1.1	Measurement procedure	11
6.1.2	Expression of the results	11
6.2	Direct measurement of mobility (source and receiver)	11
6.3	Source single equivalent blocked force squared	12
7	Indirect measurement of source quantities (Reception plate method)	12
7.1	Principle of the method	12
7.2	Source single equivalent blocked force	13
7.2.1	Source single equivalent blocked force squared determination	13
7.2.2	Low mobility reception plate(s)	13
7.2.3	Mounting of the source specimen	14
7.2.4	Link to EN 15657-1:2009	14
7.3	Source single equivalent free velocity	14
7.3.1	Source single equivalent free velocity determination	14
7.3.2	High mobility reception plate	15
7.3.3	Mounting of the source specimen	15
7.4	Source single equivalent mobility	15
8	Precision	15
8.1	Round Robin	15
8.2	Repeatability	15
8.3	Reproducibility	15
9	Expression of results	16
10	Test report	16
Annex A (normative) List of symbols		17
Annex B (normative) Specifications for Whirlpool baths		19
B.1	Scope	19
B.2	Specifications for whirlpool baths	19
B.2.1	Mounting of the specimen	19
B.2.2	Operating conditions	19
B.2.3	Expression of results	19
B.3	Operating conditions for the tub filling phase, using a reference water jet	19

B.3.1	General	19
B.3.2	Specification for a defined water jet.....	20
B.3.3	Test procedure	20
	Annex C (normative) Power substitution method.....	22
C.1	General	22
C.2	Principle of the method.....	22
C.3	Measuring procedure.....	22
C.4	Specifications for low mobility plates.....	23
C.5	Specifications for high mobility plates.....	23
	Annex D (informative) Link to models predicting structure borne sound pressure levels.....	24
D.1	General	24
D.2	Link to EN 12354-5.....	24
D.2.1	General	24
D.2.2	Low mobility receiver	24
D.2.3	High mobility receiver	25
D.3	Link to EN ISO 12354-2.....	25
	Annex E (informative) Reference structure borne sound power calculation.....	26
E.1	General	26
E.2	Low mobility reference test rig	26
E.3	High mobility reference test rig	26
	Annex F (informative) Example of existing test rigs	27
F.1	Low mobility reception plates	27
F.2	High mobility reception plate	29
	Bibliography	30

European foreword

This document (EN 15657:2017) 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 January 2018, and conflicting national standards shall be withdrawn at the latest by January 2018.

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

This document supersedes EN 15657-1:2009.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is the result of merging two documents dealing with laboratory characterization of service equipment: former standard EN 15657-1:2009, which was restricted to receivers of mobility much lower than the source mobility, and draft prEN 15657-2, valid for all installation conditions.

The characterization leads to the determination of the equipment installed structure-borne power, which depends on the source and the receiver, using expressions which have been simplified and approximated in order to use 1/3 octave single equivalent quantities, easily measurable in laboratories for input data for predictions.

The laboratory method for measuring airborne sound, part of former EN 15657-1, is not included in this revised standard. If a measurement of the airborne sound power of the equipment is required, then the methods described in EN ISO 3740 to EN ISO 3747 should be used.

1 Scope

This European Standard specifies methods for estimating the structure-borne sound power produced in buildings by services equipment (sources) from measurements under laboratory conditions. The data can be used as explained in Annex D, as input for EN 12354-5, or under certain conditions for EN ISO 12354-2, to calculate the sound pressure levels produced by the same equipment when installed in buildings. The data can also be used to compare the performance of products as explained in Annex E.

As for the document predicting the structure-borne sound levels produced in the buildings by service equipment (EN 12354-5), this European Standard covers water supply and sanitary installations, mechanical ventilation, heating and cooling devices, service equipment, lifts, rubbish chutes, boilers, blowers, pumps, motors and other auxiliary service equipment, such as motor driven car park doors; it can also be applied to other vibrating equipment attached to or installed in buildings. This standard is so far restricted to steady-state vibrating sources.

This revised European Standard:

- specifies laboratory measuring methods for determining the source input data required to calculate the source installed power, i.e. the equipment free velocity, the equipment blocked force and the equipment mobility;
- applies to equipment, which can be connected to isolated plates in the laboratory. For equipment, such as pipe systems or impacted lightweight stairs [16], which are connected to at least two building elements (wall and floor), a coupled reception plate system is specified, which requires the use of a power substitution method. The later method can also be used *in situ* when the equipment, such as lifts, can only be tested *in situ*;
- defines the expression of the source installed structure-borne power for any source-receiver mobility conditions, including lightweight and heavyweight receiving building elements. This power is used as input data in EN 12354-5, which predicts the sound pressure level generated by the source installed *in situ* in a building;
- defines a method to calculate the total structure-borne sound power generated by the equipment fictively mounted on two sets of reference test plates (respectively of low mobility and of high mobility); the two results will inform the manufacturers on the difference in the equipment performance between these two common but very different situations;
- does not specify any method for the measurement of the source airborne sound power. If measurements of the equipment airborne sound power are required, then refer to EN ISO 3740 to EN ISO 3747 and use the same source mounting conditions and operating conditions as in measuring using EN 15657.

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 ISO 10140-3, *Acoustics - Laboratory measurement of sound insulation of building elements - Part 3: Measurement of impact sound insulation (ISO 10140-3)*

EN ISO 10848-1, *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, *Mechanical vibration and shock — Mechanical mounting of accelerometers*

ISO 7626-1:2011, *Mechanical vibration and shock — Experimental determination of mechanical mobility — Part 1: Basic terms and definitions, and transducer specifications*

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

ISO 7626-5, *Vibration and shock — Experimental determination of mechanical mobility — Part 5: Measurements using impact excitation with an exciter which is not attached to the structure*

ISO 9611, *Acoustics — Characterization of sources of structure-borne sound with respect to sound radiation from connected structures — Measurement of velocity at the contact points of machinery when resiliently mounted*

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

ISO 18312-1, *Mechanical vibration and shock — Measurement of vibration power flow from machines into connected support structures — Part 1: Direct method*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN