

Laboratory measurement of airborne and
structure-borne sound from service equipment - Part
1: Application rules for waste water installations

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 14366-1:2023 sisaldab Euroopa standardi EN 14366-1:2023 ingliskeelset teksti.	This Estonian standard EVS-EN 14366-1:2023 consists of the English text of the European standard EN 14366-1:2023.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
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English Version

Laboratory measurement of airborne and structure-borne
sound from service equipment - Part 1: Application rules
for waste water installations

Mesurage en laboratoire des bruits aériens et
structuraux des équipements techniques - Partie 1 :
Règles d'application aux installations d'évacuation des
eaux usées

Bauakustik - Messung von Luftschall und Körperschall
von gebäudetechnischen Anlagen im Prüfstand - Teil 1:
Anwendungsregeln für Abwasserinstallationen

This European Standard was approved by CEN on 28 May 2023.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Page

European foreword.....	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 Symbols.....	8
5 Measuring method.....	9
5.1 Airborne sound measurements	9
5.2 Structure borne sound measurements	10
5.2.1 General.....	10
5.2.2 Calibration of the test facilities	10
5.2.3 Indirect procedures for testing the specimen	11
5.2.4 Specimen free velocity direct measurement.....	12
5.2.5 Specimen single equivalent mobility estimation	12
6 Equipment	13
6.1 Requirements for the frequency range of measurement	13
6.2 Requirements for the acoustic equipment	13
6.3 Requirements for the hydraulic equipment.....	13
6.4 Requirements for the vibration measuring equipment.....	13
7 Test facilities.....	14
7.1 Construction requirements	14
7.1.1 Test room	14
7.1.2 Test wall	14
7.2 Acoustic requirements.....	14
8 Test specimen.....	14
8.1 Geometry.....	14
8.1.1 Components	14
8.1.2 Falling height h	14
8.1.3 Standard configuration	14
8.1.4 Other configurations considered	16
8.2 Mounting of the specimen.....	16
8.2.1 General.....	16
8.2.2 Requirements for airborne sound measurement	16
8.2.3 Requirements for the standard configuration	16
9 Expression of the results	17
9.1 General.....	17
9.2 For use in comparing products and materials.....	17
9.2.1 General.....	17
9.2.2 Single number descriptor for airborne sound.....	18
9.2.3 Single number descriptor for structure-borne sound.....	18
9.3 For use in predicting equipment sound pressure levels in buildings.....	19
9.4 Summary	19
10 Accuracy	19

11	Test report	20
Annex A (normative)	Cases of vertical pipes with offset and horizontal pipes.....	22
A.1	General	22
A.2	Vertical pipes with offset	22
A.3	Horizontal pipes.....	22
Annex B (normative)	Test procedures for piping system mitigation measures.....	26
B.1	General	26
B.2	Mitigation measure characterization.....	26
B.2.1	Pipe enclosure (technical shaft).....	26
B.2.2	Pipe lining.....	28
B.3	Single number descriptor for mitigation measures.....	29
B.4	Test results for mitigation measures	29
B.4.1	Pipe enclosure	29
B.4.2	Pipe lining.....	29
Annex C (informative)	Link from EN 14366:2004+A1:2019 to EN 14366-1	31
Bibliography		32

European foreword

This document (EN 14366-1:2023) 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 2024, and conflicting national standards shall be withdrawn at the latest by January 2024.

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 14366:2004+A1:2019.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

Noise from waste water installations is generated by the flow of water in the piping system. There are many different ways to install such systems in buildings, depending on national building codes. They may be firmly cemented into walls and floors, fixed by clips in walls and covered slabs, or hung exposed in the plenum above a suspended ceiling or hidden by an enclosure. It seems advisable, therefore, to define measuring methods for both structure-borne and airborne sound. The first standard on laboratory sound measurements of waste water installations (EN 14366) was published in 2004. The present standard is a revision of EN 14366:2004+A1:2019, and is still focused on laboratory characterization of waste water installations for both airborne and structure-borne sound, but now uses the same characterization methods as for building service equipment, i.e. EN 15657. In particular, structure-borne sound is now characterized by vibration measurements and therefore only one test room is required in the standard for airborne sound measurement.

NOTE The room is particularly necessary to keep the former standard configuration, where the piping system mounting conditions in a room are similar to the ones in buildings. A method based on acoustical intensity could be used with no room at all; such a method is not precisely defined and validated yet, but could be standardized in a future revision of the standard.

Important noise sources are bends after vertical sections, bends for pipe deviation, but also discontinuities, e.g. inlets, couplings and sleeves. The revised standard keeps the standard configuration specified in the former one (straight pipe system connected to walls), but also considers vertically deviated pipes connected to walls and horizontal pipes connected to ceilings.

In addition, the revised standard includes measuring the performance of mitigation measures such as pipe enclosures (technical shaft) and pipe lining.

The title and numbering of the revised document have been changed, now opened to other application standards for equipment systems such as water supply installations.

1 Scope

This document characterizes waste water or rain water piping systems as airborne sound source and structure-borne sound source using the same method as the one described in EN 15657 for characterizing building service equipment. It therefore applies to equipment installed in any type of buildings (heavy or lightweight).

This document:

- specifies laboratory measuring methods for determining the input data required for both comparing products and materials, and predicting sound levels in buildings using EN 12354-5. These input quantities are the piping system sound power level for airborne sound and three quantities for structure-borne sound (piping system free velocity, blocked force and mobility), from which the piping system installed power, source input for EN 12354-5, is determined;
- specifies the method for the measurement of the equipment airborne sound power;
- only considers piping systems connected to one supporting building element in a first step;

NOTE Simultaneous structure-borne transmissions to wall and floor are more difficult to handle. In the configurations proposed in this document, the piping system is only connected to one supporting element and mechanically decoupled from the other elements.

- includes configurations of vertical pipes with offset (deviated horizontally) connected to walls and horizontal pipes connected to ceilings, for which the measuring method is the same as the one defined for straight vertical pipes connected to walls. These complementary configurations are described in (normative) Annex A;
- specifies laboratory test procedures for determining the performance of mitigation measures such as pipe enclosures (technical shaft) and pipe lining. The corresponding specifications are given in (normative) Annex B;
- defines the expression of the results for use in comparing products and materials and for use as input data for prediction; however, the Single Number Quantities used to compare products cannot be used as a prediction or proof of compliance with requirements in a building;
- indicates a method to transform the quantities measured according to EN 14366:2004+A1:2019, to the quantities used in this document; however, the calculated values cannot be used as certified values obtained by test, but only for comparison with new tests. This method is given in (informative) Annex C.

This document is applicable to waste water piping systems and parts thereof, but not to the actual sources of waste water, e.g. lavatories, toilets and bathtubs or any active units, which are considered separately in EN 12354-5 and are characterized separately. It applies to pipes with natural ventilation and made of any common material in commonly used diameters (up to 160 mm).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 12354-5:2023, *Building acoustics — Estimation of acoustic performance of buildings from the performance of elements — Part 5: Sounds levels due to the service equipment*

EN 15657:2017, *Acoustic properties of building elements and of buildings — Laboratory measurement of structure-borne sound from building service equipment for all installation conditions*

EN ISO 10140-4, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 4: Measurement procedures and requirements (ISO 10140-4)*

EN ISO 10140-5, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 5: Requirements for test facilities and equipment (ISO 10140-5)*

EN ISO 10848-1, *Acoustics — Laboratory and field measurement of flanking transmission for airborne, impact and building service equipment sound between adjoining rooms — Part 1: Frame document (ISO 10848-1)*

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

ISO 5348, *Mechanical vibration and shock — Mechanical mounting of accelerometers*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org>

3.1

waste water

any type of water including rainwater evacuated from buildings into the sewer system

3.2

waste water installation

total of pipes and all fixing components, used to evacuate waste water, but excluding the actual sources of the waste water, e.g. sinks, toilets, bathtubs, gutter or any active units (pumps...)

3.3

specimen

simple waste water installation system with a single path of water flow

Note 1 to entry: A specimen is the object of tests according to this document.

Note 2 to entry: Any combination of commercial elements (or prototype elements) may be assembled and installed according to the instructions given by the producer or distributor of the installation to form a specimen.

3.4

test room

room used for both airborne and structure-borne sound measurements

Note 1 to entry: The specimen is mounted inside the test room.

3.5

standard configuration

mandatory form of specimen used for comparison