



SLOVENSKI STANDARD

SIST EN 16487:2015

01-marec-2015

Akustika - Preskusni postopek za viseče strope - Absorpcija zvoka

Acoustics - Test code for suspended ceilings - Sound absorption

Akustik - Prüfvorschrift für Unterdecken - Schallabsorption

Acoustique - Code d'essai des plafonds suspendus - Absorption phonique

Ta slovenski standard je istoveten z: **EN 16487:2014**

[SIST EN 16487:2015](https://standards.iteh.ai/catalog/standards/sist/9afa406d-5f3e-40b3-8813-c9f0fa25bb44/sist-en-16487-2015)

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ICS:

91.060.30	Stropi. Tla. Stopnice	Ceilings. Floors. Stairs
91.120.20	Akustika v stavbah. Zvočna izolacija	Acoustics in building. Sound insulation

SIST EN 16487:2015

en,fr,de

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EUROPEAN STANDARD

EN 16487

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2014

ICS 91.060.30; 91.120.20

English Version

Acoustics - Test code for suspended ceilings - Sound absorption

Acoustique - Code d'essai des plafonds suspendus -
Absorption acoustique

Akustik - Prüfvorschrift für Unterdecken - Schallabsorption

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COMITÉ EUROPÉEN DE NORMALISATION
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Contents	Page
Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Test arrangements.....	6
4.1 Test specimens	6
4.1.1 Plane absorbers	6
4.1.2 Discrete sound absorbers	10
4.2 Temperature and humidity.....	12
4.2.1 Choice of test conditions	12
4.2.2 Relative humidity	12
4.2.3 Check of test conditions	13
4.3 Rules for sampling.....	13
5 Measurement of reverberation time.....	13
5.1 Microphones and microphone positions	13
5.2 Empty room measurement	13
6 Measurement uncertainty	13
6.1 General.....	13
6.2 Uncertainty	13
7 Test report	15
Annex A (informative) Round Robin Test performed for the development of this Test Code standard	16
Bibliography	18

Foreword

This document (EN 16487:2014) 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.

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 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 May 2015, and conflicting national standards shall be withdrawn at the latest by May 2015.

This standard is a complement to the European Standard EN ISO 354 and is not intended to replace it. The complement includes more stringent rules, narrower tolerances and new, additional requirements to be used for compilation of data for the CE marking of suspended ceilings.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

Product standard EN 13964 “Suspended ceilings — Requirements and test methods” provides information on how to mark or label products for the CE marking. When the suspended ceiling has a sound absorption property, its sound absorption coefficients should be established by testing according to EN ISO 354. The measured sound absorption coefficients are calculated into the practical sound absorption coefficient α_p , in octave bands and into a single number value α_w with shape indicator, in accordance with EN ISO 11654. The single number value α_w is used for the CE marking.

Measurement of sound absorption coefficients according to EN ISO 354 is through earlier RRTs (Round Robin Tests) known to generate large spread in results from different laboratories. This is not acceptable, either from a competition point of view or from an end-user perspective. Therefore, CEN/TC 126 “Acoustic properties of building elements and of buildings” decided to set up a working group, WG 11 “Test Code for suspended ceilings”, with the scope to improve reproducibility by developing a Test Code. One part of this work was to organize a Round Robin Test (RRT) for sound absorption measurements.

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1 Scope

This European Standard specifies additional necessary information on how to carry out efficiently and under standardized conditions the determination of the sound absorption coefficients according to EN ISO 354 “Measurement of sound absorption in a reverberation room”. It specifies the additional requirements of the sound absorption measurements and the operating and mounting conditions that should be used for the test. Observe that all demands in EN ISO 354 still should be fulfilled. The results obtained are used for design calculations with respect to room acoustics and to convert frequency-dependent sound absorption coefficients into a weighted sound absorption coefficient α_w , according to EN ISO 11654.

This European Standard is applicable for the compile of the single number rating α_w , to express the sound absorption performance of suspended ceiling membranes in CE marking and labelling according to EN 13964. This European Standard is not applicable for suspended ceiling kits according to EN 13964.

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 13964:2014, *Suspended ceilings - Requirements and test methods*

EN ISO 354:2003, *Acoustics - Measurement of sound absorption in a reverberation room (ISO 354:2003)*

EN ISO 11654, *Acoustics - Sound absorbers for use in buildings - Rating of sound absorption (ISO 11654)*

NOTE Due to the strong links between this standard and EN ISO 354:2003 and EN 13964:2014, references to relevant paragraphs are given where applicable

3 Terms and definitions

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

3.1

test object

designation of a sound absorbing product being a part of a test specimen

3.2

test specimen

designation of all the test objects included in a measurement

3.3

area of the test specimen

S

area of the test objects creating the test specimen

Note 1 to entry The area is expressed in square metres with two decimals.

[SOURCE: EN ISO 354:2003, 3.8 modified – by replacing “floor or wall” with “test objects” and by deleting the second note related to test specimen surrounded by a structure]

3.4

suspended ceiling

ceiling hung by a suspension from or by a directly fixed substructure or perimeter trim to the load bearing structure (floor, roof, beam and walls) at a distance from the floor or roof above

[SOURCE: EN 13964:2014, 3.1.2]

EN 16487:2014 (E)**3.5****ceiling membrane**

exposed surface of the ceiling facing the room, excluding any exposed substructure

[SOURCE: EN 13964:2014, 3.3.1]

3.6**ceiling membrane component**

product forming part of the ceiling membrane (e.g. a tile or plank)

[SOURCE: EN 13964:2014, 3.3.2]

3.7**suspended ceiling kit**

set of at least two separate components that need to be put together to be installed permanently in the works

[SOURCE: EN 13964:2014, 3.1.4 modified – by deleting the sentence after the definition and the notes]

3.8**plane absorbers**

horizontal objects (ceiling membrane components) creating a continuous surface (ceiling membrane)

3.9**baffles**

discrete sound absorbers installed as vertical objects (ceiling membrane components) at a certain distance from each other

Note 1 to entry: see Figure 1

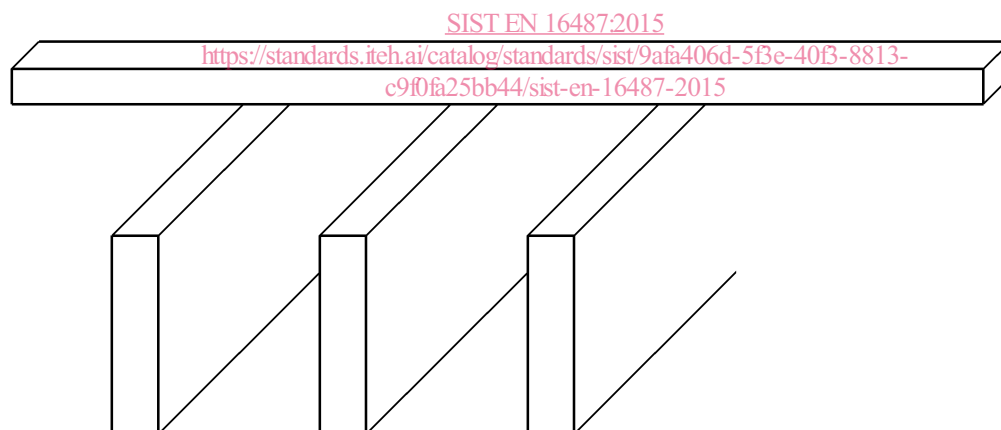


Figure 1 — Example for a baffle (other design systems may exist)

4 Test arrangements**4.1 Test specimens****4.1.1 Plane absorbers****4.1.1.1 Size and mounting details for test specimen, test objects and mounting fixture**

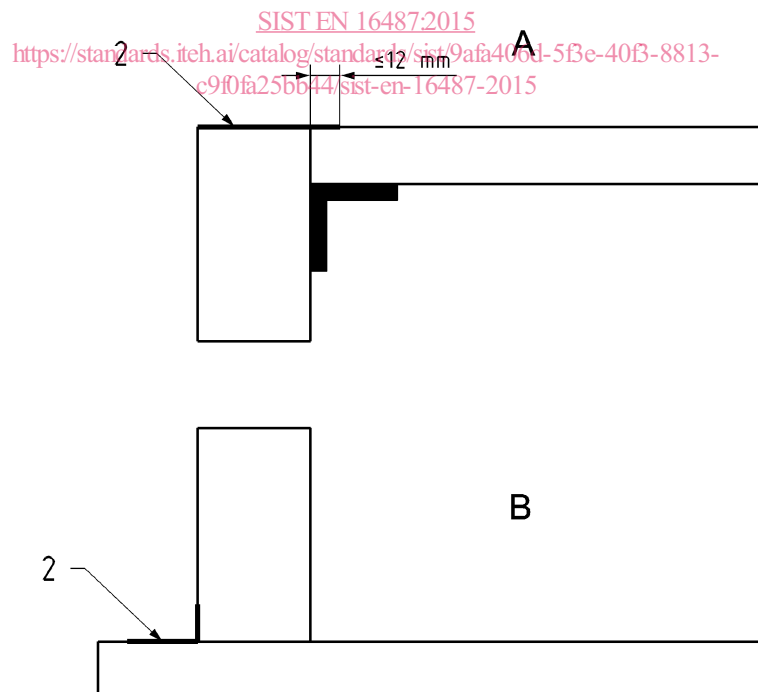
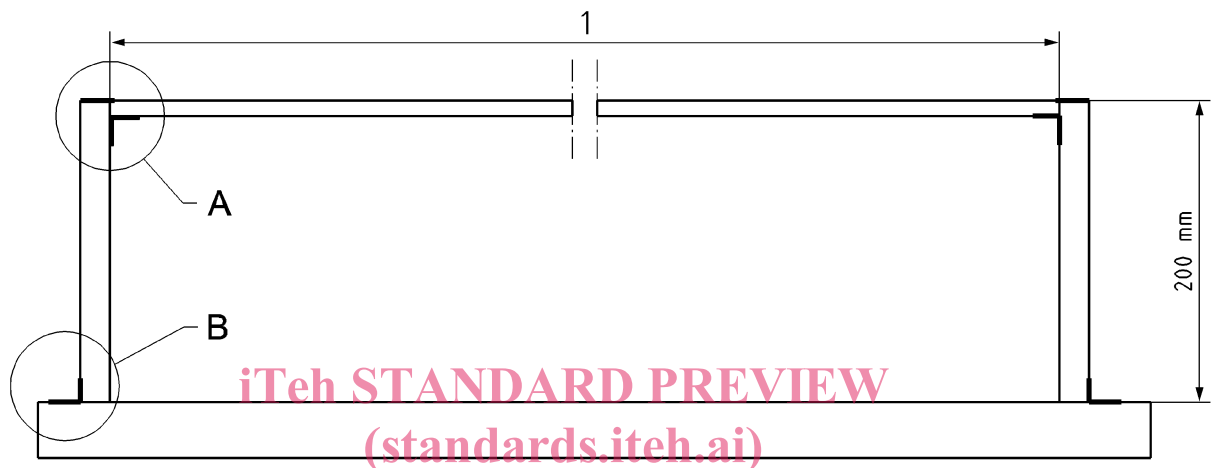
4.1.1.1.1 The test specimen shall have an area as close to 10,80 m² as possible. (EN ISO 354:2003, 6.2.1.1)

4.1.1.1.2 The size of the test objects should be 0,6 m × 0,6 m and if not available the closest possible size in the product range.

4.1.1.1.3 Test objects shall be mounted butt together with no seal in the joints. The mounting of the test objects shall be described in the test report.

The area S of the test specimen shall be the actual size of the plane consisting of the test objects butt together, Figure 2.

4.1.1.1.4 The exposed side of the suspended ceiling shall be at the same level as the top of the mounting fixture and the joint between the test specimen and the mounting fixture shall be covered by a tape, Figure 2, Detail A, or a flexible sealant.



Key

- 1 measure for calculation of S
- 2 tape

Figure 2 — Dimension to be used for calculation of specimen area S . Detail A showing application of tape over joint

EN 16487:2014 (E)

4.1.1.1.5 The edges of the specimen and the mounting fixture shall not be parallel to the nearest edge of the room; an angle of at least 10° should be aimed at. (EN ISO 354:2003, 6.2.1.2)

4.1.1.1.6 Mounting fixture shall be of solid, preferably wooden material, without any cavities and with a surface density of at least 20 kg/m^2 . (EN ISO 354:2003, B.4)

NOTE In order to have a mounting fixture, flexible to small variations of the specimen size, the so called "wind mill solution" might be an alternative to a fixed-size mounting fixture, Figure 3.



Figure 3 — Mounting fixture of wind mill type

4.1.1.1.7 Open joints within the mounting fixture shall be sealed to prevent air leakage between the enclosed space and the outside. Any open cavity inside the fixture shall also be sealed, to avoid sound absorption in the enclosed space in accordance to EN ISO 354:2003, B.4.

4.1.1.2 Type of plane absorber mounting

4.1.1.2.1 Type A mounting according to EN ISO 354:2003, B.2

4.1.1.2.1.1 This mounting is used for products that are attached directly against a hard surface or substructure by adhesives or mechanical fasteners, which do not leave any thin air space between the product and the surface to which it is attached.

4.1.1.2.1.2 The perimeter edge of the test specimen shall be sealed or covered with the mounting fixture as described in 4.1.1.1 to prevent the edges from absorbing sound. However if the edges of the test specimen are exposed when the products are normally installed in an actual application, then the edges of the test

specimen shall not be sealed or covered by any mounting fixture during a test. If the edges are not sealed or covered, the area of the edges shall be included in calculating the test specimen area.

The treatment of the edges of the test specimen shall be described in the test report. If the area of the specimen edges was included in the calculation of test specimen area, this shall be noted in the test report.

4.1.1.2.2 Type B mounting according to EN ISO 354:2003, B.3

4.1.1.2.2.1 This mounting is used for products that are glued directly to a hard surface with an acoustic panel adhesive, an application which normally leaves a thin airspace between the product and the surface to which it is adhered.

4.1.1.2.2.2 The perimeter edge of the test specimen shall be sealed or covered with the mounting fixture as described in 4.1.1.1 to prevent the edges from absorbing sound. If there are no instructions how thick to apply the dabs of the adhesive, a 3 mm airspace shall be used. In order to secure the air space, shims of 3 mm thickness of size 25 mm by 25 mm shall be located at the 4 corners of each test object.

4.1.1.2.2.3 If a gypsum board is used as the hard surface it shall remain in the reverberation room also during the measurement of the empty room reverberation.

4.1.1.2.3 Type E mounting according to EN ISO 354:2003, B.4

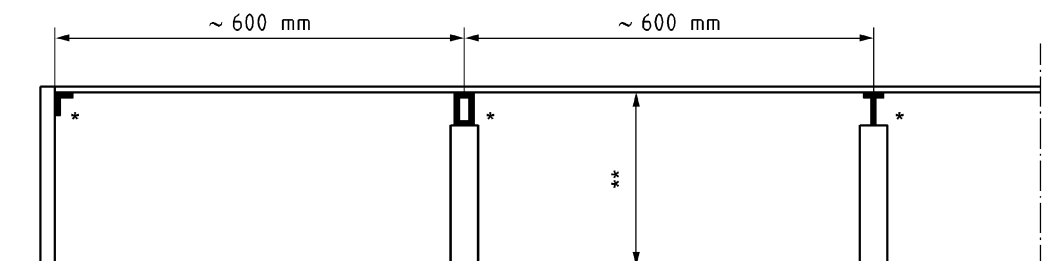
4.1.1.2.3.1 This mounting is used for products that are suspended from a hard surface creating an important air space in between. According to EN ISO 11654, it is recommended to make at least one measurement with an overall depth of construction of 200 mm, which also shall be used for the compilation of data for CE marking, Figure 2.

4.1.1.2.3.2 For the purpose of CE marking it is not allowed to make measurements with the specimen embedded in the floor, having the surface of the specimen at the same level as the floor and the air-space down in the floor.

4.1.1.2.3.3 Grids shall not be used to cover the joints between test objects. Test objects with exposed edges due to absence of grids during measurement, should be avoided, if other edge types are available and have the same acoustic properties.

NOTE If grids for some reason are included in the measurement, the figures received will represent a suspended ceiling kit and not a ceiling membrane according to EN 13964.

4.1.1.2.3.4 Test objects might be supported in one direction by a substructure with a width ≤ 30 mm, a height ≤ 50 mm and a centre distance of approx. 0,6 m, Figure 4.



Key

- * Substructure profiles of any shape and material with width ≤ 30 mm and height ≤ 50 mm.
- ** Deflection of the test specimen at any point ≤ 5 mm

Figure 4 — Substructure properties