ISO/FDIS 26101-2:2024(en)

ISO/TC 43/SC

Secretariat: DIN

Date: 2024-01-29xx

Acoustics— Test methods for the qualification of the acoustic environment— ___

Part_2:

Determination of the environmental correction

<u> Acoustique — Méthodes d'essai pour la qualification de l'environnement acoustique —</u>

Partie 2: Détermination de la correction d'environnement

Document Preview

150/1D15 20101-2

FDIS stage

Formatted	[
Formatted	
Style Definition	<u> </u>
Style Definition	
Style Definition	
Style Definition	
Style Definition	[
Style Definition	
Style Definition	<u> </u>
Style Definition	
Style Definition	<u> </u>
Style Definition	
Style Definition	

Style Definition

Formatted: Font: Bold

Formatted: HeaderCentered, Left

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office CP 401 • Ch. de Blandonnet 8 CH-1214 Vernier, Geneva Phone: +41 22 749 01 11

Fax: +41 22 749 09 47

EmailE-mail: copyright@iso.org

Website: www.iso.orgwww.iso.org

Published in Switzerland

Formatted: Left: 1.5 cm, Right: 1.5 cm, Header distance from edge: 1.27 cm, Footer distance from

Commented [eXtyles1]: The reference "ISO 2024" is to a withdrawn standard

Formatted: Default Paragraph Font

Formatted: Default Paragraph Font

Formatted: French (France)

Formatted: French (France)

Formatted: French (France)

Formatted: zzCopyright address, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

iTeh Standards (https://standards.iteh.ai) Document Preview

ISO/FDIS 26101-2

https://standards.iteh.ai/catalog/standards/iso/e24c2474-e8f6-4202-80e7-f9c93203daf3/iso-fdis-26101-2

Formatted: FooterPageRomanNumber, Left

Formatted: Font: 11 pt, Bold

Formatted: Font: Bold

Formatted: HeaderCentered, Left

Contents

<u>Forew</u>	<u>Foreword</u> vi		
<u>Introduction</u> vii			
1	Scope		
2	Normative references		
3	Terms and definitions1		
4	Qualification procedures for the acoustic environment		
4.1	General3		
4.2	Absolute comparison test		
4.3	Methods based on room absorption3		
4.4	Inverse-square-law qualification of parallelepiped and cylindrical measurement surfaces3		
4.5	Approximate method based on an estimation of the equivalent absorption area4		
5	Absolute comparison test		
5.1	General 6		
5.2	Locations of reference sound source in test environment		
5.3	Information to be recorded and reported		
6	Determination of the environmental correction based on room absorption7		
6.1	General 7		
6.2	Reverberation method		
6.3	Two-surface method		
6.4	Determination of the equivalent absorption area with a reference sound source (direct method) _8		
6.5	Information to be recorded and reported9		
7	Inverse-square-law qualification of parallelepiped and cylindrical measurement surfaces 10		
7.1	General 10		
7.2	Qualification criteria		
7.2.1	General10		
7.2.2	Maximum allowable deviations from inverse square law10		
7.2.3	Frequency range to be qualified11		
7.2.4	Maximum qualified volume11		
7.3	Installation of test sound sources and microphone traverses		
7.3.1	Test sound source requirements11		
7.3.2	Test sound source location11		
7.3.3	Microphone traverse paths for parallelepiped and cylindrical measurement surfaces 11		
7.4	Test procedure		
7.4.1	Analysis bandwidth14		
7.4.2	Generation of sound14		
7.4.3	Spatial resolution of the measurement points		

Formatted: Font: 10 pt

Formatted: Font: 10 pt

Formatted: Font: 10 pt

Formatted: FooterCentered, Left, Space Before: 0 pt,

Tab stops: Not at 17.2 cm

Formatted: Font: 11 pt

Formatted: FooterPageRomanNumber, Left

© ISO- 2024 - All rights reserved

iii

Formatted: Font: Bold

Formatted: HeaderCentered, Left

<u>7.5</u>	Information to be recorded and reported15
8	Approximate method based on an estimation of the equivalent absorption area15
8.1	General15
8.2	Information to be recorded and reported16
Anne	A (informative) Uncertainty of the environmental correction17
<u>Biblio</u>	graphy18
Forev	ord v
Introd	uction vi
1	Scope 1
2	Normative references 1
3	Terms and definitions 1
4	Qualification procedures for the acoustic environment 3 Tandards
4.1	Consult 2
4.2	Absolute comparison test 3 (https://standards.iteh.ai)
4.3	Methods based on room absorption 3
4.4	Inverse square law qualification of parallelepiped and cylindrical measurement surfaces 3
4.5	Approximate method based on an estimation of the equivalent absorption area A 3
5	Absolute comparison test 5
5.1	General 5 ISO/FDIS 26101-2
5.2	Locations of reference sound source in test environment 80/5 24c2474-e8f6-4202-80e7-f9c93203daf3/iso-fdis-26101-2
5.3	Information to be recorded and reported 6
6	Determination of the environmental correction based on room absorption 6
6.1	General 6
6.2	Reverberation method 6
6.3	Two surface method 7
6.4	Determination of the equivalent absorption area A with a reference sound source (direct method) 7
6.5	Information to be recorded and reported 8
7	Inverse-square-law qualification of parallelepiped and cylindrical measurement surfaces 9
7.1	General 9
7.2	Qualification criteria 9
	General 9
	Maximum allowable deviations from inverse square law 9
	Frequency range to be qualified 10
7.2.4	Maximum qualified volume 10 Formatted: FooterPageRomanNumber, Left

7.3	Installation of test sound sources and microphone traverses 10
7.3.1	Test sound source requirements 10
7.3.2	Test sound source location 10
7.3.3	Microphone traverse paths for parallelepiped and cylindrical measurement surfaces 10
7.4	Test procedure 13
7.4.1	Analysis bandwidth 13
7.4.2	Generation of sound 13
7.4.3	Spatial resolution of the measurement points 13
7.5	Information to be recorded and reported 14
88	Approximate method based on an estimation of the equivalent absorption area A — 14
8.1	General 14
8.2	Information to be recorded and reported 15
Annex .	A (informative) Uncertainty of the environmental correction 16
A.1	Absolute comparison test and methods based on room absorption — 16
A.2	Inverse square-law method 16
Bibliog	iTeh Standards

(https://standards.iteh.ai)

Document Preview

<u>180/FD18 26101-2</u>

https://standards.iteh.ai/catalog/standards/iso/e24c2474-e8f6-4202-80e7-f9c93203daf3/iso-fdis-26101-2

Formatted: Font: 10 pt
Formatted: Font: 10 pt
Formatted: FooterCentered, Left, Space Before: 0 pt, Tab stops: Not at 17.2 cm

Formatted: Font: 11 pt

Formatted: Font: 10 pt

Formatted: Font: 11 pt, Bold
Formatted: Font: Bold

Formatted: HeaderCentered, Left

Formatted: FooterPageRomanNumber, Left

© ISO-2024 - All rights reserved

V

Formatted: Font: Bold

Formatted: HeaderCentered, Left

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part-1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part-2 (see www.iso.org/directives).

Attention is drawnISO draws attention to the possibility that some of the elementsimplementation of this document may be involve the subjectuse of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights, in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

 $\begin{array}{l} \textbf{Attention is drawn to the possibility that some of the elements of this} \underline{\textbf{This}} \ \textbf{document may be the subject of patent rights.} \ \textbf{ISO shall not be held responsible for identifying any or all such patent rights.} \\ \end{array}$

ISO 26101 2—was prepared by Technical Committee ISO/TC 43, Acoustics, Subcommittee SC 1, Noise__int_ocollaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 211, Acoustics, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 26101 series can be found on the ISO website.

Commented [eXtyles2]: ISO 26101-2: current stage is 50.00

Formatted: Font: Italic

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Commented [eXtyles3]: Invalid reference: "ISO 26101 series"

Formatted: Default Paragraph Font

Formatted: Default Paragraph Font

Formatted: Default Paragraph Font

Formatted: FooterPageRomanNumber, Left

© ISO 2024 - All rights reserved

Any feedback or questions on this document should be directed to the user's national standards body. complete listing of these bodies can be found at www.iso.org/members.html.

Formatted: Font: 11 pt, Bold

Formatted: Font: Bold

Formatted: HeaderCentered, Left

iTeh Standards (https://standards.iteh.ai) Document Preview

ISO/FDIS 26101-2

https://standards.iteh.ai/catalog/standards/iso/e24c2474-e8f6-4202-80e7-f9c93203daf3/iso-fdis-26101-2

Formatted: Font: 10 pt

Formatted: Font: 10 pt

Formatted: Font: 10 pt

Formatted: FooterCentered, Left, Space Before: 0 pt,

Tab stops: Not at 17.2 cm

Formatted: Font: 11 pt

Formatted: FooterPageRomanNumber, Left

© ISO-2024 - All rights reserved

vii

Formatted: Font: Bold

Formatted: HeaderCentered, Left

Introduction

This document is one of the series JSO 26101, which specify various methods for qualifying the acoustic environment. The methods specified in this document permit the qualification of an acoustic environment that approximates to an acoustic free field near one or more reflecting planes. In other words, an acoustic environment in which the effect of reflected sound on sound pressure level measurements is sufficiently small, so that it can be corrected for with the so-called environmental correction K_2 , K_2 , K_2 can be needed to determine the sound power level, see e.g. JSO $_2$ 744 or JSO $_3$ 746; $_2$ 121, or the emission sound pressure level, see e.g. JSO $_1$ 1201; $_2$ 150, J1202 $_2$ 1616 and JSO $_1$ 1204; $_2$ 171.

It is expected that the qualification procedures outlined in this document will be referred to by other International Standards and industry test codes. In such cases, these documents making reference to this document can specify qualification criteria based on the environmental correction K_2K_2 determined according to this document.

Commented [eXtyles4]: The reference is to a withdrawn standard which has been replaced

ISO 26101-1, Acoustics — Test methods for the qualification of the acoustic environment — Part 1: Qualification of free-field environments

Formatted: Default Paragraph Font

Formatted: Default Paragraph Font

Commented [eXtyles5]: ISO 3744: current stage is 50.00

Formatted: Default Paragraph Font

iTeh Standards (https://standards.iteh.a Document Preview

ISO/FDIS 26101-2

https://standards.iteh.ai/catalog/standards/iso/e24c2474-e8f6-4202-80e7-f9c93203daf3/iso-fdis-26101-2

Formatted: FooterPageRomanNumber, Left

Acoustics—___ Test methods for the qualification of the acoustic environment—___

Part

Determination of the environmental correction

1 Scope

This document specifies methods for qualifying an environment that approximates to an acoustic free field near one or more reflecting planes. The goal of the qualification is to determine the environmental correction K_{2} , which is used to correct for reflected sound when determining the sound power level or sound energy level of a noise source from sound pressure levels measured on a surface enveloping the noise source (machinery or equipment) in such an environment.

In practice, the K_ZK_2 value determined will be a function of both the reflected sound from the test environment and the shape and size of the measurement surface used for the K_ZK_2 determination. For the purposes of this document and the documents that refer to it, the differences between K_ZK_2 values determined with different measurement surfaces are assumed to be included in the stated measurement uncertainty for the test method.

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.

<std>ISO 3745;2012, Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Precision methods for anechoic rooms and hemi-anechoic rooms

<std>ISO 6926, Acoustics — Requirements for the performance and calibration of reference sound sources used for the determination of sound power levels

<std>ISO 26101-ISO 26101-1, Acoustics — Test methods for the qualification of the acoustic environment - Part 1: Qualification of free-field environments</sd>

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 3744 and the following apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

© ISO 2024 – All rights reserved

Formatted: English (United Kingdom)

Formatted: Left

Formatted: Left: 1.5 cm, Right: 1.5 cm, Header distance from edge: 1.27 cm, Footer distance from

Formatted: Main Title 2, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted: Default Paragraph Font

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers, Tab stops: Not at 0.7 cm + 1.4 cm + 2.1 cm + 2.8 cm + 3.5 cm + 4.2 cm + 4.9 cm + 5.6 cm + 6.3 cm + 7 cm

Formatted: Default Paragraph Font

Formatted: Default Paragraph Font
Formatted: Default Paragraph Font

Formatted: Default Paragraph Font

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Commented [eXtyles6]: ISO 3744: current stage is 50.00

Formatted: Default Paragraph Font

Formatted: Default Paragraph Font

Commented [eXtyles7]: The URL

https://www.iso.org/obp has been redirected to https://www.iso.org/obp/ui. Please verify the URL

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers, Tab stops: Not at 0.7 cm + 1.4 cm + 2.1 cm + 2.8 cm + 3.5 cm + 4.2 cm + 4.9 cm + 5.6 cm + 6.3 cm + 7 cm

Formatted: Footer, Left, Space Before: 0 pt, After: 0 pt, Line spacing: single

⁴ Under preparation. Stage at the time of the ballot: ISO/FDIS 3744:2024

² Under preparation. Stage at the time of the ballot: ISO/FDIS 3744:2024.

Formatted: HeaderCentered, Left

Formatted: Font: Bold

—IEC Electropedia: available at https://www.electropedia.org/

3.1

reverberation time

T

T

⟨room acoustic parameters⟩ duration required for the space-averaged sound energy density in an enclosure to decrease by 60 dB after the source emission has stopped

Note_1-to entry:-The reverberation time is expressed in seconds.

Note_2-to entry:-T can be evaluated based on a smaller dynamic range than 60 dB and extrapolated to a decay time of 60 dB. It is then labelled accordingly. Thus, if T is derived from the time at which the decay curve first reaches 5 dB and 25 dB below the initial level, it is labelled T_{20} - T_{20} . If decay values of 5 dB to 35 dB below the initial level are used, it is labelled T_{30} - T_{30} .

[SOURCE: ISO 3382-2:2008, 1111, 3.5]

3.2

measurement surface

hypothetical surface of area, S_7S_2 on which the microphone positions are located at which the sound pressure levels are measured, enveloping the noise source under test and terminating on the reflecting plane(s) on which the source is located

[SOURCE: ISO 3744: 2024,: ___, 3.13]

3.3

environmental correction

 K_{Z}

 K_2

correction applied to the mean (energy average) sound pressure levels over all the microphone positions on the measurement surface (3.2), (3.2), to account for the influence of reflected or absorbed sound

Note 1_to entry:_Environmental correction is expressed in decibels.

Note 2-to entry:-The environmental correction is frequency dependent; the correction in the case of a frequency band is denoted K_{2f} , K_{2f} , where f denotes the relevant mid-band frequency, and that in the case of overall A-weighting is

denoted K_{2A} , K_{2A} , which is determined from A-weighted sound pressure level measurements.

Note 3-to entry:-In general, the environmental correction depends on the area of the measurement surface and usually $K_T K_2$ increases with -S-S₃.

[SOURCE: ISO 3744:<u>2024; ___</u> 3.16, modified "determined as described in Annex Annex A or in ISO 26101-12; __ " and "Note 4 to entry" have been omitted.]

3.4

sound absorption coefficient

α

α

at a given frequency and for specified conditions, the relative fraction of sound power incident upon a surface* which is not reflected

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted: Symbol, Font: Cambria

Formatted: Symbol, Font: Cambria

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers, Tab stops: Not at 0.7 cm + 1.4 cm + 2.1 cm + 2.8 cm + 3.5 cm + 4.2 cm + 4.9 cm + 5.6 cm + 6.3 cm + 7 cm

Formatted: Default Paragraph Font

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Commented [eXtyles8]: Not found, but similar references exist

ISO 3744:2010, Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane

Formatted: Default Paragraph Font

Formatted: Default Paragraph Font

Formatted: Default Paragraph Font

Formatted: Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted

Formatted: Default Paragraph Font

Formatted

Commented [eXtyles9]: Not found, but similar referenc

Commented [eXtyles10]: ISO 26101-2:—: current stage

Formatted: Default Paragraph Font

Formatted: Default Paragraph Font

Formatted

Formatted: FooterPageRomanNumber, Left