

---

**Akustika - Merjenje dodanega dušenja dušilnika zvoka v kanalu brez pretoka -  
Laboratorijska informativna metoda (ISO/DIS 11691:2019)**

Acoustics - Measurement of insertion loss of ducted silencers without flow - Laboratory survey method (ISO/DIS 11691:2019)

Akustik - Messung des Einfügungsdämpfungsmaßes von Schalldämpfern in Kanälen ohne Strömung - Laborverfahren der Genauigkeitsklasse 3 (ISO/DIS 11691:2019)

Acoustique - Détermination de la perte d'insertion de silencieux en conduit sans écoulement - Méthode de mesurage en laboratoire (ISO/DIS 11691:2019)

**Ta slovenski standard je istoveten z: prEN ISO 11691**

---

**ICS:**

17.140.01	Akustična merjenja in blaženje hrupa na splošno	Acoustic measurements and noise abatement in general
91.120.20	Akustika v stavbah. Zvočna izolacija	Acoustics in building. Sound insulation

**oSIST prEN ISO 11691:2019****en**



# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 11691

ISO/TC 43/SC 1

Secretariat: DIN

Voting begins on:  
2019-04-10Voting terminates on:  
2019-07-03

### Acoustics — Measurement of insertion loss of ducted silencers without flow — Laboratory survey method

*Acoustique — Détermination de la perte d'insertion de silencieux en conduit sans écoulement — Méthode de mesurage en laboratoire*

ICS: 91.120.20

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

SIST EN ISO 11691:2021

<https://standards.iteh.ai/catalog/standards/sist/83bbcd3-75f5-4cd2-90f9-5a65ce38b7b3/sist-en-iso-11691-2021>

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

This document is circulated as received from the committee secretariat.

**ISO/CEN PARALLEL PROCESSING**



Reference number  
ISO/DIS 11691:2019(E)

© ISO 2019

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN ISO 11691:2021

<https://standards.iteh.ai/catalog/standards/sist/83bbcd3-75f5-4cd2-90f9-5a65ce38b7b3/sist-en-iso-11691-2021>



### **COPYRIGHT PROTECTED DOCUMENT**

© ISO 2019

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  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
1.1 General.....	1
1.2 Measurement uncertainty.....	1
<b>2 Normative references</b> .....	<b>2</b>
<b>3 Terms and definitions</b> .....	<b>2</b>
<b>4 Test facility</b> .....	<b>3</b>
4.1 General.....	3
4.2 Sound measuring equipment.....	4
4.3 Sound source equipment.....	5
4.3.1 General.....	5
4.3.2 Electronic equipment, loudspeaker unit and transition element.....	5
4.3.3 Modal filter.....	5
4.4 Transition elements.....	6
4.5 Test and substitution ducts.....	6
4.6 Reverberation room.....	6
4.7 Other measurement environments.....	6
<b>5 Test procedure</b> .....	<b>6</b>
<b>6 Information to be recorded</b> .....	<b>7</b>
6.1 General.....	7
6.2 Description of the silencer under test.....	7
6.3 Description of test arrangement.....	7
6.4 Acoustical test result.....	8
<b>7 Information to be reported</b> .....	<b>8</b>
<b>Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2006/42/EC aimed to be covered</b> .....	<b>9</b>
<b>Bibliography</b> .....	<b>10</b>

## ISO/DIS 11691:2019(E)

## 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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. 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](http://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 on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

This second edition cancels and replaces the first edition (ISO 11691:1995), which has been technically revised.

## Introduction

The insertion loss of absorbent silencers is generally not affected by the air flow, provided that the flow velocity does not exceed approximately 20 m/s in the narrowest cross-section of the silencer. In practice, non-uniform flow distributions must be considered, therefore the limit velocity of 20 m/s corresponds to a design velocity of 10 m/s to 15 m/s.

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

SIST EN ISO 11691:2021

<https://standards.iteh.ai/catalog/standards/sist/83bbcd3-75f5-4cd2-90f9-5a65ce38b7b3/sist-en-iso-11691-2021>





# Acoustics — Measurement of insertion loss of ducted silencers without flow — Laboratory survey method

## 1 Scope

### 1.1 General

This document specifies a laboratory substitution method to determine the insertion loss without flow of ducted, mainly absorbent, circular and rectangular silencers, as well as other duct elements for use in ventilating and air-conditioning systems.

NOTE 1 Laboratory measurement procedures for ducted silencers with superimposed flow are described in ISO 7235.

This document is applicable to silencers where the design velocity does not exceed 15 m/s. As the method does not include self-generated flow noise, this document is not suitable for tests on silencers where this type of noise is of great importance for the evaluation of the silencer performance. As most silencers, particularly in offices and dwelling, have design velocities below 15 m/s this document can often be a cost efficient alternative to ISO 7235.

The insertion loss determined according to this document in a laboratory will not necessarily be the same as the insertion loss that will be obtained in an installation in the field. Different sound and flow fields in the duct will yield different results. In this document the sound field will be dominated by plane wave modes. As this document requires regular test ducts, the results may include some flanking transmission via structural vibrations in the duct walls, that sets an upper limit to the insertion loss that can be determined.

NOTE 2 ISO 7235 gives methods for determining this limit.

This document is intended to be used for circular silencers with diameters of 80 mm to 2000 mm or rectangular silencers with cross-sectional areas within the same range.

### 1.2 Measurement uncertainty

Due to lack of knowledge the determination of the uncertainty of results obtained from measurements according to this document does not comply with ISO/IEC Guide 98-3[2]. Exact information on the precision of the method cannot be given at this time. Therefore this document is denoted a survey standard. However, due to a simpler and more narrowly defined test set-up it is estimated that this method will have a standard deviation of reproducibility,  $\sigma_R$ , as defined in ISO 5725-2, which is equal to or better than that of ISO 7235. See [Table 1](#).

**Table 1 — Estimated values of the standard deviation of reproducibility**

Mid-band frequencies of the one-third-octave band	Standard deviation of reproducibility, $\sigma_{Ri}$ , of the insertion loss
Hz	dB
50 to 100	1,5
125 to 500	1
630 to 1 250	2
1 600 to 10 000	3

## ISO/DIS 11691:2019(E)

## 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.

ISO 3741, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Precision methods for reverberation test rooms*

ISO 3743-1, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for small movable sources in reverberant fields — Part 1: Comparison method for a hard-walled test room*

ISO 3744, *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*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

ISO 7235, *Acoustics — Laboratory measurement procedures for ducted silencers and air-terminal units — Insertion loss, flow noise and total pressure loss*

ISO 9614-2, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning*

IEC 60942, *Sound calibrators*

IEC 61183, *Electroacoustics — Random-Incidence and Diffuse-Field Calibration of Sound Level Meters*  
IEC 61260-1, *Electroacoustics — Octave-band and fractional-octave-band filters — Part 1: Specifications*

IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*

IEC 61672-3, *Electroacoustics — Sound level meters — Part 3: Periodic tests*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

## 3 Terms and definitions

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

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

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

### 3.1 insertion loss

*D*

reduction in level of sound power propagating through a duct due to the insertion of a silencer into the duct system in place of a substitution duct

Note 1 to entry: Insertion loss is expressed in decibels.

### 3.2 test duct

straight standard duct of constant cross-section in front of and behind the silencer under test

Note 1 to entry: The purpose of the test ducts is to separate the test object from the sound source and the reverberation room.