**ISO/DTS 19425~~:20XX (X)~~**

ISO-/TC-70~~/WG13~~

Secretariat: SAC

Date: 2024-~~01-27~~03-28

# Reciprocating internal combustion engines — Measurement method for air cleaners— — Sound power level of combustion air inlet noise and insertion loss using sound pressure



~~DTS stage~~



~~**Warning for WDs and CDs**~~

~~This document is not an ISO International Standard. It is distributed for review and comment. It is subject to change without notice and may not be referred to as an International Standard.~~

~~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.~~

~~*A model manuscript of a draft International Standard (known as "The Rice Model") is available at https://www.iso.org/iso/model_document-rice_model.pdf*~~

*Moteurs alternatifs à combustion interne — Méthode de mesure du bruit des purificateurs d'air — Niveau de puissance sonore du bruit d'entrée d'air de combustion et de perte d'insertion utilisant une pression sonore*



 

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: + 41 22 749 01 11
EmailE-mail: copyright@iso.org
Website: www.iso.orgwww.iso.org

Published in Switzerland

## Contents

Foreword ..... vii
1 Scope ..... 1
2 Normative references ..... 1
3 Terms and definitions ..... 1
4 Test environment ..... 6
4.1 General ..... 6
4.2 Criterion for background noise ..... 6
4.3 Criterion for acoustic adequacy of test environment ..... 7
5 Instrumentation ..... 7
5.1 General ..... 7
5.2 Calibration ..... 7
5.3 Application ..... 8
6 Installation and operation conditions ..... 8
6.1 General ..... 8
6.2 Installation condition ..... 8
6.3 Operation condition ..... 10
7 Measurement ..... 10
7.1 General ..... 10
7.2 Measurement uncertainty ..... 10
7.3 Characteristic source dimension ..... 11
7.4 Measurement radius ..... 12
7.5 Measurement surface and area ..... 12
7.6 Microphone arrays ..... 12
8 Calculation ..... 15
8.1 General ..... 15
8.2 Calculation of sound power level ..... 16
8.2.1 Mean time-averaged sound pressure levels ..... 16
8.2.2 Corrections for background noise ..... 16
8.2.3 Corrections for environmental ..... 17
8.2.4 Surface time-averaged sound pressure levels ..... 17
8.2.5 Sound power levels ..... 17
8.3 Calculation of insertion loss ..... 18
9 Information to be recorded ..... 18
10 Test report ..... 19
Annex A (normative) Qualification procedures for the acoustic environment ..... 20
A.1 General ..... 20
A.2 Reverberation method ..... 20
A.3 Two-surface method ..... 21
A.4 Determination of the equivalent absorption area *A* with a reference sound source ..... 21
A.5 Approximate method for Measurements made with A-weighting ..... 22
A.6 A-weighted sound power levels ..... 23
A.7 Values of *j* and *Aj* for use in calculations ..... 23
Bibliography ..... 26

*This template allows you to work with default MS Word functions and styles. You can use these if you want to maintain the Table of Contents automatically and apply auto-numbering.*

*To update the Table of Contents please select it and press "F9".*

**Foreword** ..... v
**Introduction** ..... vi
**1 Scope *(mandatory)*** ..... 1
**2 Normative references *(mandatory)*** ..... 1
**3 Terms and definitions *(mandatory)*** ..... 1
**4 Test environment** ..... 5
**4.1 General** ..... 5
**4.2 Criterion for background noise** ..... 5
**4.3 Criterion for acoustic adequacy of test environment** ..... 6
**5 Instrumentation** ..... 6
**5.1 General** ..... 6
**5.2 Calibration** ..... 6
**5.3 Application** ..... 7
**6 Installation and operation conditions** ..... 7
**6.1 General** ..... 7
**6.2 Installation condition** ..... 7
**6.3 Operation condition** ..... 8
**7 Measurement** ..... 8
**7.1 General** ..... 8
**7.2 Measurement uncertainty** ..... 9
**7.3 Characteristic source dimension** ..... 10
**7.4 Measurement radius** ..... 10
**7.5 Measurement surface and area** ..... 10
**7.6 Microphone arrays** ..... 10
**8 Calculation** ..... 12
**8.1 General** ..... 12
**8.2 Calculation of sound power level** ..... 12
**8.2.1 Mean time-averaged sound pressure levels** ..... 12
**8.2.2 Corrections for background noise** ..... 13
**8.2.3 Corrections for environmental** ..... 13
**8.2.4 Surface time-averaged sound pressure levels** ..... 14
**8.2.5 Sound power levels** ..... 14
**8.3 Calculation of insertion loss** ..... 14
**9 Information to be recorded** ..... 14
**10 Test report** ..... 15
**Annex A (normative) Qualification procedures for the acoustic environment** ..... 16
**A.1 General** ..... 16
**A.2 Reverberation method** ..... 16
**A.3 Two-surface method** ..... 16
**A.4 Determination of the equivalent absorption area *A* with a reference sound source** ..... 17
**A.5 Approximate method for Measurements made with A-weighting** ..... 17

Annex B (normative) Calculation of A-weighted sound power levels from frequency band levels19
B.1 A-weighted sound power levels ..... 19
B.2 Values of $f_j$ and $A_j$ for use in calculations ..... 19
Annex C (normative) Sound power level under reference meteorological conditions ..... 21
Bibliography ..... 22

## 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 documentsdocument 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).

Field Code Changed

Attention is drawnISO draws attention to the possibility that some of the elementsimplementation of this document may beinvolve 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.

Field Code Changed

This document was prepared by Technical Committee ISO/TC 70, *Air-borne noise* Subcommittee *SC, SAC*.



This second edition cancels and replaces the first edition (ISO 19425:2015), which has been technically revised.

The main changes are as follows:

— —the terms and definitions have been changed as required by the current revised version of the Directives, and provenance of terms and definitions is indicatedsources have been added (see 3);Clause 3);

— —the criterion for background noise has been changed (see 4.2);4.2);

— —the application has been changed (see 5.3);5.3);

— —the installation condition has been changed (see 6.2);6.2);

— —the operation condition has been changed (see 6.3);6.3);

— —the measurement radius has been changed(see 7.4). (see 7.4).

~~A list of all parts in the ISO TS 19425 series can be found on the ISO website.~~

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

Field Code Changed

## Introduction

Type text.

*Identification of patent holders: the following text shall be included if patent rights have been identified.*

The International Organization for Standardization (ISO) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent.

ISO takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured ISO that he/she is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with ISO. Information may be obtained from the patent database available at www.iso.org/patents.

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

# Reciprocating internal combustion engines — Measurement method for air cleaners — Sound power level of combustion air inlet noise and insertion loss using sound pressure

## 1 Scope ~~(mandatory)~~

This ~~Technical Specification~~document specifies the measurement method and requirements for combustion air inlet noise of air cleaners which are installed on reciprocating internal combustion engines, including laboratory measurement (engineering method and survey method) and site measurement (survey method).

This ~~Technical Specification~~document applies to all air cleaners installed on reciprocating internal combustion engines (reciprocating internal combustion engine is referred to as engine hereafter, except ~~particular explanation in the following text~~for specific explanations) falling within the field of application of ISO 3046-1 and/or other air induction installation.

## 2 Normative references ~~(mandatory)~~

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.

ISO 3046-1, *Reciprocating internal combustion engines — Performance — Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods — Additional requirements for engines for general use*

ISO 3046-3, *Reciprocating internal combustion engines — Performance — Part 3: Test measurements*

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

IEC 60942, *Electroacoustics — Sound calibrators*

IEC 61260, *Electroacoustics — Octave-band and fractional-octave-band filters*

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

## 3 Terms and definitions ~~(mandatory)~~

For the purposes of this document, the terms and definitions defined in ISO 3046-1, ISO 3046-3, ISO 6926, IEC 60942, IEC 61260 and IEC 61672-1 and the following 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**
**sound pressure**
*p*
difference between instantaneous pressure and static pressure

Note 1 to entry: It is expressed in pascals.