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Acoustics — Software for the calculation of sound outdoors —

Part 1: Quality requirements and quality assurance

Acoustique — Logiciels de prévision de bruit dans l'environnement —
Partie 1: Exigences de qualité et assurance qualité

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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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

ISO 17534 consists of the following parts, under the general title *Acoustics — Software for the calculation of sound outdoors*:

— *Part 1: Quality requirements and quality assurance*

— *Part 2: General recommendations for test cases and quality assurance interface* [Technical Report]

— *Part 3: Recommendations for quality assured implementation of ISO 9613-2 in software according to ISO 17534-1* [Technical Report]

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Introduction

Noise calculation methods are a mathematical description on how to determine noise levels at receivers from the emission data of sources and from data describing the acoustically relevant environment along the propagation paths. In some cases, they include the determination of the sound emission from the technical parameters of the sources. Even if knowledge about the physics of sound propagation grows continuously driven by research and experience, the standardized calculation methods are adapted to this increasing state of the art stepwise and remain constant some years for reasons of planning stability. If obviously relevant influences on sound emission and sound propagation cannot, with sufficient accuracy, be derived from physical models with existing knowledge, empirically constructed mathematical formulations are often applied as a time-limited agreement. Such a compromise between experts needs careful consideration of pros and cons and is generally derived and periodically reconsidered by standardization or similar groups.

In some cases, software programs are designed and developed to apply a certain documented method. Software products with more than one alternatively selectable calculation method implemented are software platforms, often organizing many other important jobs and operations like the user interfacing, the data input and output facilities, the tools to inspect and modify the input data, and last but not least, the tools to present and analyse the result data.

The illustration in Figure 1 shows the structure of the ISO 17534 series. Such a subdivision generated by the introduction of a row of Technical Reports is necessary because in many cases, existing standards or alternative documentations of calculation method are not complete in the sense that certain situations occurring in real scenarios are not or not sufficiently covered. Existing specifications are often unclear and allow different interpretations — in such cases, it is necessary to reduce the degrees of freedom and varying interpretations by writing down the best possible compromise as an “interim solution” as long as the responsible standardization committee or another responsible body will not fill the gap.

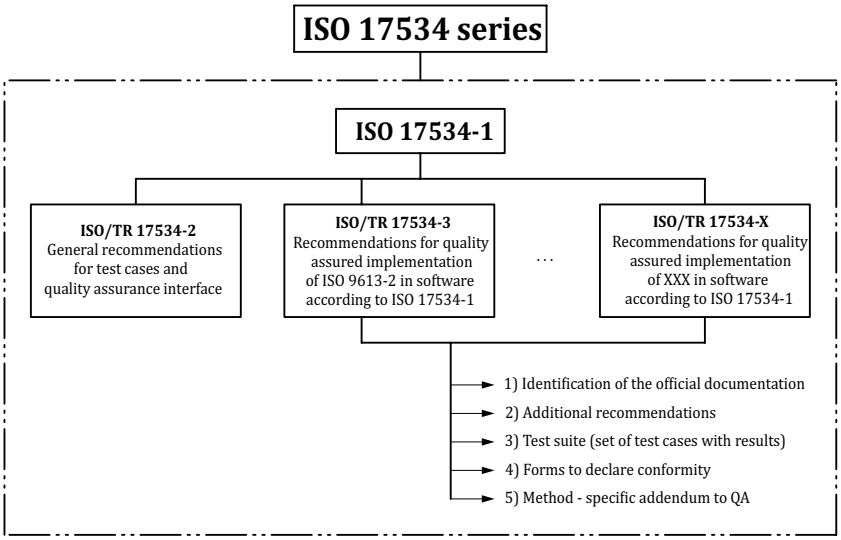


Figure 1 — Structure of the ISO 17534 series consisting of the main Part 1 and subordinated Technical Reports

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Acoustics — Software for the calculation of sound outdoors —

Part 1:
Quality requirements and quality assurance

1 Scope

ISO 17534-1 describes quality requirements and measures to ensure, to indicate, and to verify the degree of conformity of a software program with a consistently implementable calculation method/procedure.

The main objective of ISO 17534-1 is to ensure that applying a consistent implementable calculation method with different quality assured software products on an identical set of input data will produce the same results within a defined range of acceptable deviations.

ISO 17534-1 enables the producer of this type of software to declare and to proof the correct implementation of a calculation method and the software user to verify it without the necessity of a third-party certification. It takes into account that software developers and software users are members of the same scientific-technical community and offers means and measures for a transparent and open communication between them.

ISO 17534-1 does not cover the aspect of correctness of the calculation method itself, i.e. especially the agreement of calculated results with results obtained with measurements will not be touched.

2 Terms and definitions

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

2.1
accuracy
agreement of results calculated with a software with those obtained by strict obedience of the method according to its official documentation

2.2
beta version
version of the software not yet ready for release but sent to a selected group of users for testing and comment

2.3
calculation method
complete set of algorithms, simulations, and other routines necessary to determine a result in accordance with the scope of the method on the basis of a complete set of input data

Note 1 to entry: A set of input data that quantifies and describes the noise sources output and position, the geometric and acoustic properties of the environment that influence sound propagation, and the positions of the receivers.

Note 2 to entry: For the purpose of ISO 17534-1, “calculation”, “prediction”, or “computation” has the same meaning.

2.4
calculation ray
polygon line representing a propagation path from a point source to a receiver taken into account to calculate the corresponding sound contribution

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