TECHNICAL ISO/TR

First edition
2015-01-15

# Acoustics — Software for the calculation of sound outdoors —

## Part 3: Recommendations for quality assured implementation of ISO 9613-2 in software according to ISO 17534-1

*Acoustique — Logiciels de prévision de bruit dans l'environnement —*

*PartieParte 3: Recommandations pour l'assurance qualité mise en oeuvre de la norme ISO 9613-2 dans le logiciel selon ISO 17534-1*

Reference number
ISO/TR 17534-3:2015(E)



ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

# Contents

Page

**Foreword** ... **v**

**Introduction** ... **vi**

**1 Scope** ... **1**

**2 Normative references** ... **1**

**3 Terms and definitions** ... **1**

**4 Identification of the official documentation** ... **1**

**5 Additional recommendations** ... **1**

5.1 General ... 1
5.2 Screening ... 2
5.3 Limitation of the maximal possible attenuation by barriers ... 4
5.4 Calculation of the path-length difference, ***z*** ... ***4***
5.5 Diffraction with barrier on reflecting ground ... 4
5.6 No level increase caused by barriers due to lateral diffraction ... 4
5.7 No ground effect calculated with rays laterally diffracted ... 5
5.8 No lateral diffraction with elevated ground screening the direct ray ... 5
5.9 Multi-reflection ... the extension to reflections of higher orders ... 5

**6 Test cases** ... **6**

6.1 General ... 6
6.2 Test cases with step by step results and final result interval ... 6
6.2.1 T01-T03 ... Flat ground with homogeneous acoustic properties ... 6
6.2.2 T01 ... Reflecting ground (***G*** = 0) ... 7
6.2.3 T02 ... Mixed ground (***G*** = 0,5) ... 8
6.2.4 T03 ... Porous ground (***G*** = 1) ... 9
6.2.5 T04 ... Flat ground with spatially varying acoustic properties ... 9
6.2.6 T05 ... Identical to T04, but calculation with the alternative method according to ISO 9613-2:1996, 7.3.2 ... 11
6.2.7 T06 ... Ground with spatially varying heights and acoustic properties ... 12
6.2.8 T07 ... Identical to T06, but calculation with the alternative method according to ISO 9613-2:1996, 7.3.2 ... 15
6.2.9 T08 ... Flat ground with spatially varying acoustic properties and long barrier ... 16
6.2.10 T09 ... Flat ground with spatially varying acoustic properties and short barrier ... 19
6.2.11 T10 ... Ground with spatially varying heights and acoustic properties and short barrier ... 22
6.2.12 T11 ... Flat ground with homogeneous acoustic properties and cubic building ... receiver at low height ... 24
6.2.13 T12 ... Flat ground with homogeneous acoustic properties and cubic building ... receiver at large height ... 28
6.2.14 T13 ...

Flat ground with homogeneous acoustic properties and polygonal building ... receiver at low height ... 31
6.2.15 T14 ... Ground with spatially varying heights and acoustic properties and polygonal building ... 34
6.2.16 T15 ... Flat ground with homogeneous acoustic properties and polygonal building ... receiver at large height ... 37
6.2.17 T16 ... Flat ground with homogeneous acoustic properties and three buildings ... 39
6.2.18 T17 ... Flat ground with homogeneous acoustic properties and three buildings ... alternative position of source and receiver ... 43
6.2.19 T18 ... Flat ground with homogeneous acoustic properties and complex building with backyard ... 46
6.2.20 T19 ... Ground with spatially varying heights and acoustic properties and reflecting barrier ... 50
**7 Declaration of conformity (DOC) ... 52**
**Bibliography ... 56**

 

# 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 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).

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 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 ensured implementation of* ISO 9613-2 *in software according to* ISO 17534-1 [Technical report]

# Introduction

The general structure of the ISO 17534 series and the various Technical Reports are shown in Figure 1. The International Standard itself describes the measures necessary to ensure a high quality of calculation methods implemented in different software products with respect to correctness and precision. The requirements and specifications included are obviously independent from a specific calculation method, because they should be applied for all of them.

This Technical Report contains additional recommendations, test cases of both types according to ISO 17534-1:—, A.2 and A.3, and the forms to declare conformity by software manufacturers related to the quality ensured implementation of the calculation method ISO 9613-2. The test cases are based on the set of test cases and input parameters documented in Reference [1]. This Technical Report is a first step. Contents will be supplemented step by step and or even withdrawn if a standardization committee responsible for this specific calculation method decides about an alternative formulation that is in agreement with the requirements of ISO 17534.

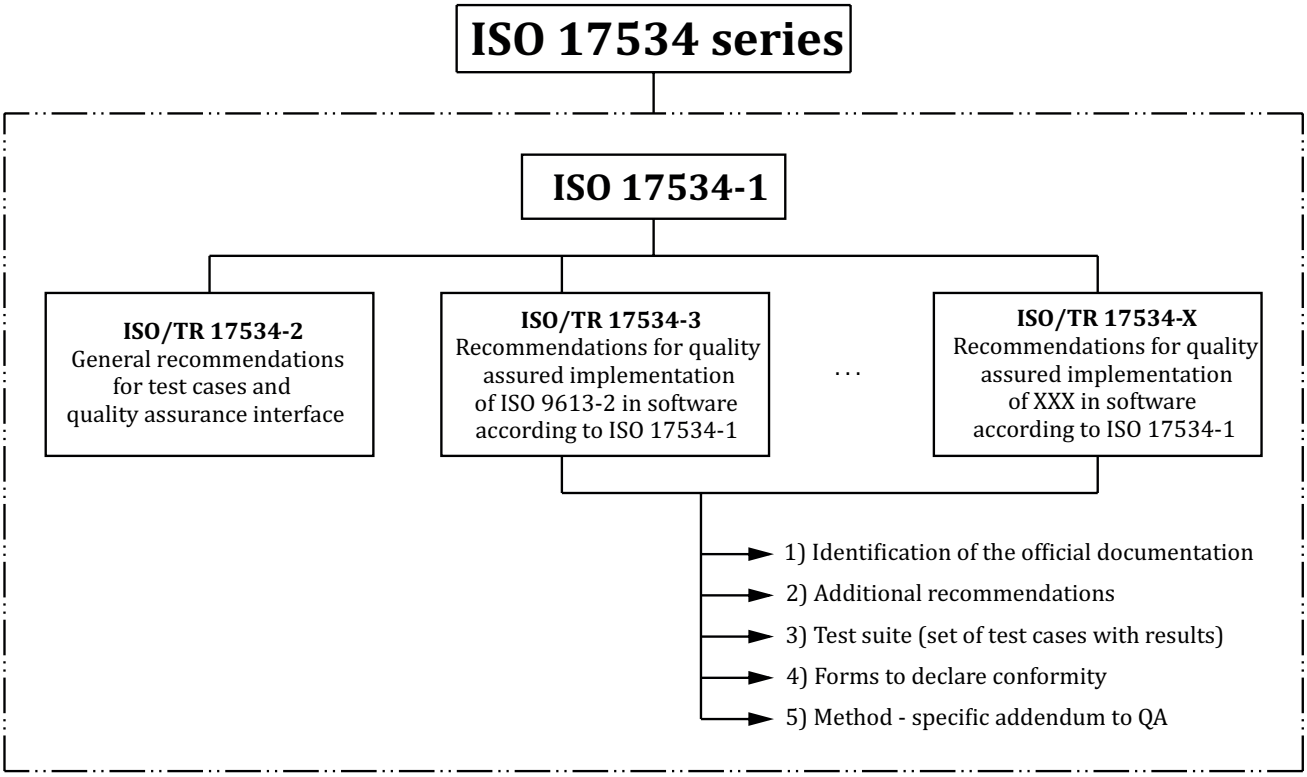


**Figure 1 — Structure of ISO 17534 series consisting of the main Part 1 and subordinated Technical Reports**