
**Acoustics — Noise from shooting
ranges —**

**Part 3:
Sound propagation calculations**

Acoustique — Bruit des stands de tir —

Partie 3: Calcul de la propagation du son

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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).

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: 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 17201-3:2010), of which it constitutes a minor revision. The changes compared to the previous edition are as follows:

- [Formulae \(B.1\)](#) and [\(B.3\)](#) have been corrected by insertion of F_0 .
- Minor corrections have been made in [Annex C](#).

A list of all parts in the ISO 17201 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.

Introduction

The initiative to prepare a standard on impulse noise from shooting ranges was taken by AFEMS, the Association of European Manufacturers of Sporting Ammunition, in April 1996 by the submission of a formal proposal to CEN. After consultation in CEN in 1998, CEN/TC 211, *Acoustics* asked ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise* to prepare ISO 17201 (all parts).

This document provides guidance for sound propagation calculation of shooting sound from shooting ranges. If calculation procedures are not implied or specified by local or national guidelines, rules and regulations, and if a more sophisticated propagation model is not available, then ISO 9613-2 may be applied, provided that the recommendations in this document are observed.

The source energy of muzzle blast is typically measured or calculated for free-field conditions and often exhibits strong directivity. In many cases, firearms are fired within a shooting range which has structures such as firing sheds, walls or safety barriers. Guns, particularly shotguns, are sometimes fired in many directions, e.g. in trap and skeet where the shooting direction is dictated by the flight path of the clay target. This document recommends ways in which source data can be adapted for use with ISO 9613-2 to obtain a general survey for the sound exposure levels to be expected in the neighbourhood around shooting ranges.

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Acoustics — Noise from shooting ranges —

Part 3: Sound propagation calculations

1 Scope

This document specifies methods of predicting the sound exposure level of shooting sound for a single shot at a given reception point. Guidelines are given to calculate other acoustic indices from the sound exposure level. The prediction is based on the angular source energy distribution of the muzzle blast as defined in ISO 17201-1 or calculated using values from ISO 17201-2.

This document applies to weapons with calibres of less than 20 mm or explosive charges of less than 50 g TNT equivalent, at distances where peak pressures, including the contribution from projectile sound, are less than 1 kPa (154 dB).

NOTE National or other regulations, which could be more stringent, can apply.

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 9613-2:1996, *Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation*

ISO 17201-1:2018, *Acoustics — Noise from shooting ranges — Part 1: Determination of muzzle blast by measurement*

ISO/IEC Guide 98-3¹⁾, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

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:

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

3.1

substitute source

substitute for a sound source and its *firing shed* (3.4) by a model source without a firing shed positioned in the centre of the opening of the firing shed to represent the emission in the direction of a reception point

3.2

safety barrier

<shooting ranges> barrier that is intended to stop projectiles leaving the range

1) ISO/IEC Guide 98-3 is published as a reissue of the Guide to the expression of uncertainty in measurement (GUM), 1995.