
**Fire detection and alarm systems —
Part 3:
Audible alarm devices**

*Systèmes de détection et d'alarme d'incendie —
Partie 3: Dispositifs d'alarme sonores*

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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
Website: www.iso.org

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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 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.

This document was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 3, *Fire detection and alarm systems*.

This second edition cancels and replaces the first edition (ISO 7240-3:2010), which has been technically revised. The main changes compared to the previous edition are as follows:

- EN 50130-4 has been replaced with IEC 62599-2 in [5.16.2.1](#) (electromagnetic compatibility immunity test);
- marking has been moved to a new [Clause 7](#);
- data and software have been moved to a new [Clause 8](#).

A list of all parts in the ISO 7240 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

In a fire detection and alarm system, the purpose of the audible alarm devices is to warn person(s) within, or near, a building of the occurrence of a fire emergency to enable such a person(s) to take appropriate measures.

Audible alarm devices using voice messages are also for warning the occupants of a building of the occurrence of a fire risk. These use a combination of an attention-drawing signal and dedicated voice message(s). Additional requirements, test methods and performance criteria specific to audible alarm devices with voice are also incorporated in this document.

ISO 8201 specifies the temporal pattern and the required sound pressure level of an audible emergency evacuation signal.

This document recognizes that the exact nature of the sound requirements, i.e. its frequency range, temporal pattern and output level, will vary according to the nature of the installation, the type of risk present and appropriate measures to be taken, the type of danger signals used by other non-evacuation alarms (see for example ISO 7731) and national differences in custom and practice. The resulting standard specifies, therefore, a common method for testing of the operational performance of audible alarm devices against the specification declared by the manufacturer, rather than imposing common requirements.

This document gives common requirements for the construction and robustness of audible alarm devices, as well as for their performance under climatic, mechanical and electrical interference conditions which are likely to occur in the service environment. Audible alarm devices have been classified in either an indoor or an outdoor application environment category.

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Fire detection and alarm systems —

Part 3: Audible alarm devices

1 Scope

This document specifies the requirements, test methods and performance criteria for audible alarm devices intended to signal an audible warning, with or without voice messages between a fire detection and fire alarm system and the occupants of a building.

This document specifies fire alarm audible alarm devices for two types of application environment, type A for indoor use and type B for outdoor use.

This document is not applicable to:

- a) loudspeaker-type devices primarily intended for emitting emergency voice messages that are generated from an external audio source;
- b) supervisory audible alarm devices, e.g. within the control and indicating equipment.

2 Normative references (standards.iteh.ai)

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 7240-1, *Fire detection and alarm systems — Part 1: General and definitions*

IEC 60068-1, *Environmental testing — Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing — Part 2-1: Tests — Test A: Cold*

IEC 60068-2-2, *Environmental testing — Part 2-2: Tests — Test B: Dry heat*

IEC 60068-2-6, *Environmental testing — Part 2-6: Tests — Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27, *Environmental testing — Part 2-27: Tests — Test Ea and guidance: Shock*

IEC 60068-2-30, *Environmental testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-42, *Environmental testing — Part 2-42: Tests — Test Kc: Sulphur dioxide test for contacts and connections*

IEC 60068-2-75, *Environmental testing — Part 2-75: Tests — Test Eh: Hammer tests*

IEC 60068-2-78, *Environmental testing — Part 2-78: Tests — Test Cab: Damp heat, steady state*

IEC 60529, *Degrees of protection provided by enclosures (IP code)*

IEC 60695-11-10, *Fire hazard testing — Part 11-10: Test flames — 50 W horizontal and vertical flame test methods*

IEC 60695-11-20, *Fire hazard testing — Part 11-20: Test flames — 500 W flame test methods*

IEC 61672-1:2002, *Electroacoustics — Sound level meters — Part 1: Specifications*

IEC 62599-2, *Alarm systems — Part 2: Electromagnetic compatibility – Immunity requirements for components of fire and security alarm systems*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7240-1 and the following apply.

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

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

3.1.1

A-weighted sound pressure level

sound pressure level expressed in dB(a), which is 20 times the logarithm to base ten of the ratio of the A-weighted sound pressure to the reference pressure of 20 µPa at 1 kHz

Note 1 to entry: The A-weighting characteristics are given in IEC 61672-1.

3.1.2

audible alarm device

AAD

device intended to signal an audible warning of fire between a fire detection and alarm system and the occupants of a building

Note 1 to entry: Audible alarm devices are sometimes referred to as “fire alarm sounders”.

3.1.3

mode of operation

one of a possible number of predefined sounds of the audible alarm device which can be selected by means specified by the manufacturer

EXAMPLE Sound patterns, sound pressure levels.

3.1.4

reference point

point representing the origin of the sound within or on the surface of the audible alarm device as specified by the manufacturer

Note 1 to entry: The reference point is used in [Annex A](#).

3.1.5

sound pattern

predefined acoustic alarm signal

Note 1 to entry: Sound pattern is also often referred to as “tone”.

3.1.6

supervisory sounder

audible device on a piece of equipment used for drawing attention to a change of status

Note 1 to entry: Supervisory sounders are often mounted within the fire detection and fire alarm control and indicating equipment.

3.1.7**type A AAD**

device primarily intended for indoor applications

Note 1 to entry: Type A AAD may be suitable for some protected outdoor situations.

3.1.8**type B AAD**

device primarily intended for outdoor applications

Note 1 to entry: Type B AAD may be more suitable than type A AAD for some indoor situations where high temperature or humidity or both are present.

3.1.9**volume control**

means for adjusting sound pressure level

3.2 Abbreviated terms

AAD audible alarm device

AC alternating current

DC direct current

RMS root mean square

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4 Requirements

[ISO 7240-3:2020](https://standards.iteh.ai/catalog/standards/sist/0832f1b8-fa0a-4f25-9eb3-df3685cde227/iso-7240-3-2020)

4.1 Compliance

In order to comply with the provisions of this document, an AAD shall meet the requirements of this clause which shall be verified by visual inspection or engineering assessment, shall be tested as described in [Clause 5](#) and shall meet the requirements of the tests.

4.2 Sound pressure level

This document requires that the manufacturer declare sound pressure levels in the data required by [8.1](#). The manufacturer may declare different sound pressure levels for operation under different conditions, e.g. when operating on different voltage ranges or with different sound patterns. If this is the case, the sound pressure level of each specimen shall be measured under each mode of operation (see [5.3](#)).

When tested in accordance with [5.3](#), the AAD shall produce A-weighted sound pressure levels of not less than 65 dB in one direction and the sound pressure level measured at each of the specified angles shall not be less than that declared by the manufacturer.

4.3 Frequency and sound pattern

This document covers AADs which produce different frequencies and sound patterns and, therefore, does not specify a minimum and maximum frequency or specific sound pattern. However, the main sound frequency(ies), frequency range(s) and sound pattern(s) shall be declared in the data required in [8.1](#).

NOTE The sound patterns and frequencies required can vary in different countries. ISO 8201 specifies a standard international evacuation signal.

4.4 Audible alarm devices (AADs) with voice

4.4.1 AADs using voice messages shall be capable of producing an audible warning signal and a voice message or messages.

4.4.2 Representative messages related to fire safety shall be declared by the manufacturer and shall be considered by the testing authority. The message determined to be worst case shall be subject to conformance assessment.

When selecting the worst-case message, message length, loudness and repetition timing should be considered.

4.4.3 For messages that require immediate action, the warning signal and message sequence broadcast by the device shall be within the following limits:

- a) warning signal, lasting for 2 s to 10 s; followed by
- b) silence, lasting for 0,25 s to 2 s; followed by
- c) voice message; followed by
- d) silence, lasting for 0,25 s to 5 s.

The time for each cycle shall not exceed 30 s.

The periods of silence may need to be longer than indicated in certain circumstances, for example in spaces with long reverberation times, but shall not be such that the time between the start of each cycle exceeds 30 s.

For other messages, it is permitted to extend either or both the silence period after the voice message and the period within which the message is repeated.

4.4.4 Access to the message recording function shall be restricted as specified in [4.6.4](#).

Persons recording messages should be trained in the proper use of microphones. The recordings should be made in a room with a controlled acoustic environment having an ambient A-weighted noise level not greater than 30 dB and a reverberation time not greater than 0,5 s from 150 Hz to 10 kHz.

4.5 Synchronization — Optional function

To prevent acoustic interaction of AADs installed in close proximity, AADs shall have provision for synchronizing warning signals and messages with that of other devices. Synchronization shall meet the requirements of [5.20.4](#).

Power interruption used for synchronization purposes shall not adversely affect the warning signal or the voice message.

NOTE Synchronization can be achieved by internal circuitry, the addition of a trigger wire connected between devices or by other means as defined by the manufacturer.

4.6 Construction

4.6.1 Provision for external conductors

4.6.1.1 The AAD shall provide space within its enclosure for entry and termination of external conductors. Entry holes for conductors or cables shall be provided or the location where such holes can be made shall be indicated by providing a template or some other suitable means.

4.6.1.2 Terminals for connecting external conductors shall be designed so that the conductors are clamped between metal surfaces without being damaged.

4.6.2 Materials

The AAD shall be constructed of material(s) capable of withstanding the tests described in 5.2 to 5.17. In addition, the material(s) of plastic enclosures shall meet the following flammability requirements:

- a) IEC 60695-11-10 Class V-2 or HB75 for devices operating from a voltage source less than or equal to 30 V RMS, or 42,4 V DC and consuming less than 15 W of power;
- b) IEC 60695-11-20 Class 5VB for devices operating from a voltage source greater than 30 V RMS, or 42,4 V DC and consuming more than 15 W of power.

NOTE Verification of conformance to 4.6.2 a) and 4.6.2 b) can be carried out by examination of a certificate of conformity or equivalent (see Annex C).

4.6.3 Ingress protection

The degree of protection provided by the enclosure of the AAD shall meet or exceed the following requirements:

- a) type A – IP21C of IEC 60529.
- b) type B – IP33C of IEC 60529.

4.6.4 Access

Means shall be provided (e.g. special tool, codes, hidden screws, seals) to limit access for removal of parts or the whole device and to make adjustments to the mode of operation.

NOTE The use of a special tool is intended to discourage unauthorized persons from easily accessing the equipment.

4.7 On-site adjustment of the mode of operation

If there is provision for on-site adjustment of the mode of operation of the AAD:

- a) for each setting at which the manufacturer claims compliance with this document, the AAD shall comply with 4.6.4;
- b) any setting(s) at which the manufacturer does not claim compliance with this document, shall comply with 4.6.4 and:
 - 1) for volume controls, the limits of the compliant range of sound pressure levels shall be clearly shown in the associated data,
 - 2) for sound pattern(s), the compliant setting(s) shall be clearly marked in the associated data.

NOTE These adjustments can be carried out at the AAD or at the control and indicating equipment.

4.8 Durability

The AAD shall be rated for at least 100 h of operation. No limitation by the manufacturer on duty factor or maximum on-time shall prevent the device from operating the 1 h “on” 1 h “off” cycle required by the test procedure described in 5.4.

This requirement does not apply to the capacity of batteries which may be used within AADs as a means of local storage of operating power. The capacity and charging requirements of such batteries need to meet the requirements of the system.