

---

---

**Fire detection and alarm systems —**

Part 19:

**Design, installation, commissioning and  
service of sound systems for emergency  
purposes**

*iTeh STANDARD PREVIEW*  
*Systemes de detection et d'alarme d'incendie —*

*(standards.iteh.ai)*  
*Partie 19: Conception, installation, prise en charge et entretien des  
systemes sonores pour les besoins de secours*

ISO 7240-19:2007

<https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813cf2b5/iso-7240-19-2007>



**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 7240-19:2007

<https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813cf2b5/iso-7240-19-2007>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2007

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

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](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

Foreword.....	v
Introduction .....	vii
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms, abbreviated terms and definitions .....</b>	<b>2</b>
3.1 Definitions .....	2
3.2 Abbreviated terms .....	3
<b>4 Design requirements .....</b>	<b>4</b>
<b>5 Planning .....</b>	<b>4</b>
5.1 Responsibilities .....	4
5.2 Qualifications .....	4
5.3 Documentation .....	4
5.4 System design.....	5
5.5 Category of s.s.c.i.e.....	6
5.6 Classification of priorities.....	7
5.7 Speech intelligibility.....	7
5.8 Warning signals .....	8
5.9 Emergency loudspeaker zones .....	9
5.10 Visual warning devices and tactile warning devices .....	10
5.11 Delay to outputs.....	10
5.12 Initiation .....	11
5.13 Manual alarm output.....	11
5.14 Sound system control and indicating equipment .....	11
5.15 Power supply.....	12
5.16 Supervision of transmission paths.....	13
5.17 Wiring.....	13
5.18 Interconnection to a fire detection and alarm system .....	14
5.19 Use for non-emergency purposes .....	14
5.20 Documentation .....	15
<b>6 Equipment and material .....</b>	<b>16</b>
6.1 Quality of components .....	16
6.2 Standards .....	16
6.3 Additional requirements .....	16
6.4 Sound system control and indicating equipment optional functions.....	16
6.5 Installation materials .....	16
<b>7 Systems compatibility .....</b>	<b>16</b>
7.1 Responsibility .....	16
7.2 Documentation .....	17
7.3 Certification .....	17
<b>8 Approvals .....</b>	<b>17</b>
<b>9 Installation .....</b>	<b>17</b>
9.1 Responsibility .....	17
9.2 Qualifications .....	17
9.3 Certification .....	18
<b>10 Commissioning .....</b>	<b>18</b>
10.1 Responsibility .....	18
10.2 Qualifications .....	18

10.3	Procedure.....	18
10.4	Certification .....	18
11	Normal use.....	18
11.1	Access to system.....	18
11.2	Other responsibilities .....	18
11.3	Routine tests and regular controls .....	19
11.4	Documentation .....	19
11.5	Operating instructions.....	19
12	Service.....	19
12.1	Responsibility.....	19
12.2	Qualifications.....	19
12.3	Service plan .....	19
12.4	Documentation .....	21
13	Abnormal situations — System disconnection .....	22
Annex A	(normative) Measurement of speech intelligibility .....	23
Annex B	(informative) Explanation of access levels.....	26
Annex C	(informative) Power source calculations .....	28
Annex D	(informative) Commissioning report .....	30
Annex E	(informative) Inspection report .....	31
Annex F	(informative) Test report .....	32
Bibliography	.....	33

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO 7240-19:2007](https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813cf2b5/iso-7240-19-2007)

<https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813cf2b5/iso-7240-19-2007>

## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 7240-19 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 3, *Fire detection and alarm systems*.

This first edition of ISO 7240-19 together with ISO 7240-16 cancels and replaces IEC 60849:1998, which has been technically revised.

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

ISO 7240 consists of the following parts, under the general title *Fire detection and alarm systems*:

- *Part 1: General and definitions*
- *Part 2: Control and indicating equipment*
- *Part 4: Power supply equipment*
- *Part 5: Point-type heat detectors*
- *Part 6: Carbon monoxide fire detectors using electro-chemical cells*
- *Part 7: Point-type smoke detectors using scattered light, transmitted light or ionization*
- *Part 8: Carbon monoxide fire detectors using an electro-chemical cell in combination with a heat sensor*
- *Part 9: Test fires for fire detectors* (Technical Specification)
- *Part 10: Point-type flame detectors*
- *Part 11: Manual call points*
- *Part 12: Line type smoke detectors using a transmitted optical beam*
- *Part 13: Compatibility assessment of system components*
- *Part 14: Guidelines for drafting codes of practice for design, installation and use of fire detection and fire alarm systems in and around buildings* (Technical Report)

## ISO 7240-19:2007(E)

- *Part 15: Point type fire detectors using scattered light, transmitted light or ionization sensors in combination with a heat sensor*
- *Part 16: Sound system control and indicating equipment*
- *Part 19: Design, installation, commissioning and service of sound systems for emergency purposes*
- *Part 21: Routing equipment*
- *Part 22: Smoke-detection equipment for ducts*
- *Part 27: Point-type fire detectors using a scattered-light, transmitted-light or ionization smoke sensor, an electrochemical-cell carbon-monoxide sensor and a heat sensor*
- *Part 28: Fire protection control equipment*

A part 26 dealing with oil mist detectors is under development.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 7240-19:2007](https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813cf2b5/iso-7240-19-2007)

<https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813cf2b5/iso-7240-19-2007>

## Introduction

A sound system for emergency purposes (s.s.e.p.) alerts occupants to a hazard that can require their safe and orderly evacuation from the building. It operates automatically or manually. Equipment to alert building occupants is, therefore, required to function after the hazard has been detected. Fire in a building is a common hazard that is often detected by an automatic fire detection and alarm system. A s.s.e.p. can operate as part of a fire detection and alarm system or can function in conjunction with other emergency detection systems.

When used for emergency purposes, it is recommended that the s.s.e.p. form part of a complete facility (equipment, operating procedures and training programmes) for the control of emergencies.

The s.s.e.p. can be the subject of approval by relevant authorities.

This part of ISO 7240 has been prepared by ISO/TC 21/SC 3 and is based on IEC 60849:1998, *Sound systems for emergency purposes* prepared by the International Electrotechnical Commission IEC/TC 100 *Audio, video and multimedia systems and equipment*.

This part of ISO 7240 contains specific requirements for the design, installation, commissioning and service of sound systems for emergency purposes and follows the general format specified in ISO/TR 7240-14.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO 7240-19:2007](https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813cf2b5/iso-7240-19-2007)

<https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813cf2b5/iso-7240-19-2007>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO 7240-19:2007](https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813cf2b5/iso-7240-19-2007)

<https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813cf2b5/iso-7240-19-2007>



# Fire detection and alarm systems —

## Part 19:

# Design, installation, commissioning and service of sound systems for emergency purposes

## 1 Scope

This part of ISO 7240 specifies the design, installation, commissioning and service requirements for a sound system for emergency purposes (s.s.e.p.; see ISO 7240-1:2005, Figure 1, item C), which is primarily intended to broadcast information for the protection of lives within one or more specified indoor or outdoor areas during an emergency. The s.s.e.p. is intended to initiate a rapid and orderly mobilization of occupants in an emergency by including systems using loudspeakers to broadcast voice announcements for emergency purposes, alert signals complying with ISO 7731 (where applicable) and evacuation signals complying with ISO 8201. In some cases, sound systems are used in preference to sounders or bells in order to broadcast a range of coded warnings that is difficult to communicate with sounders or bells.

The use of the s.s.e.p. for normal sound reinforcement and distribution systems purposes under non-hazardous circumstances is not excluded. When used for non-emergency purposes, the zoning of the loudspeakers can differ from the zones used for emergency purposes.

This part of ISO 7240 does not apply to sound systems that use bells or sounders.

## 2 Normative references

The following referenced documents are indispensable for the application 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 7240-1:2005, *Fire detection and alarm systems — Part 1: General and definitions*

ISO 7240-2, *Fire detection and alarm systems — Part 2: Control and indicating equipment*

ISO 7240-4, *Fire detection and alarm systems — Part 4: Power supply equipment*

ISO 7240-13, *Fire detection and alarm systems — Part 13: Compatibility assessment of system components*

ISO 7240-16:—, *Fire detection and alarm systems — Part 16: Sound system control and indicating equipment*

ISO 7731, *Ergonomics — Danger signals for public and work areas — Auditory danger signals*

ISO 8201, *Acoustics — Audible emergency evacuation signal*

IEC 60331-23, *Tests for electric cables under fire conditions — Circuit integrity — Part 23: Procedures and requirements — Electric data cables*

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

EN 54-24, *Fire detection and fire alarm systems — Part 24: Components of voice alarm systems — Loudspeakers*

### 3 Terms, abbreviated terms and definitions

#### 3.1 Definitions

For the purpose of this document, the terms and definitions, together with Figure 2, given in ISO 7240-1:2005 and the following apply.

##### 3.1.1

##### **acoustically distinguishable area**

###### **a.d.a.**

subdivision of an emergency loudspeaker zone, that may be an enclosed or otherwise physically defined space, characterized by an individual reverberation time and an ambient noise level

##### 3.1.2

##### **area of coverage**

area, inside and/or outside a building or structure, where the s.s.e.p. meets the requirements of this part of ISO 7240

NOTE Certain parts of an area can be excluded, see 5.4.4.

##### 3.1.3

##### **automatic mode**

mode of operation of a s.s.e.p. that is linked to a fire-detection system or other means of triggering the sound system to broadcast emergency messages without human intervention, in a manner that is pre-set according to an agreed evacuation policy

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

##### 3.1.4

##### **cabinet**

housing that affords a degree of protection and robustness to its constituent parts and subassemblies

[ISO 7240-19:2007](#)

##### 3.1.5

##### **competent person**

person who, in relation to the work undertaken, has the necessary knowledge, skill and experience to complete the work satisfactorily and without danger or injury to any person

<https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813c2b5/iso-7240-19-2007>

##### 3.1.6

##### **control point**

location from where the evacuation is controlled

NOTE The control should be undertaken by competent persons.

##### 3.1.7

##### **emergency microphone**

microphone dedicated for use by competent personnel during the voice alarm condition

##### 3.1.8

##### **emergency loudspeaker zone**

subdivision of the premises composed of one or more acoustically distinguishable areas, such that the occurrence of an emergency within it is indicated separately from any other subdivision

NOTE When used for non-emergency purposes, the zoning of the loudspeakers may differ from the zones used for emergency purposes.

##### 3.1.9

##### **listener**

person of normal hearing and who is able to understand the language used

**3.1.10****manual mode**

mode of operation where an operator is directly in control of the broadcast of live or pre-recorded sounds, especially those of an emergency nature

**3.1.11****quiescent condition**

functional condition characterized by the absence of the voice alarm, fault warning, disabled and test conditions

**3.1.12****reference ambient noise level**

sound pressure level spectrum with a reference to 20  $\mu$ Pa, together with the A-weighted sound pressure level, expressed in dBA per octave band, from 125 Hz to 8 kHz (centre frequencies) of the ambient noise level that is unlikely to be exceeded for more than 10 % of the time in emergency mode

NOTE 1 The reference ambient noise level is expressed in decibels.

NOTE 2 The reference ambient noise level is used in the assessment of speech intelligibility.

NOTE 3 Where the reference ambient noise level exceeds 90 dBA, satisfactory speech intelligibility becomes increasingly difficult to achieve.

**3.1.13****sound system control and indicating equipment****s.s.c.i.e**

equipment complying with ISO 7240-16 that is used to

- a) receive alarm signals from an emergency detection system(s),
- b) receive audio messages from emergency microphones,
- c) determine signal priority and routing,
- d) cause audible warning signals to be broadcast to emergency loudspeaker zones,
- e) automatically supervise the correct functioning of the system and give audible and visible warning of specified faults,
- f) provide manual controls and visual status indicators

**3.1.14****transmission path**

physical connection between sound system components (external to the cabinet of the component) used for the transmission of information, including audio and/or power

**3.1.15****voice alarm condition**

alert signal, evacuate signal, recorded or live emergency signal broadcast in at least one emergency loudspeaker zone

**3.2 Abbreviated terms**

- a.d.a. acoustically distinguishable area
- s.s.c.i.e. sound system control and indicating equipment
- s.s.e.p. sound system for emergency purposes

## 4 Design requirements

A s.s.e.p. shall be designed, installed, commissioned and serviced in accordance with requirements of this part of ISO 7240. The design shall also consider any national regulations that place other limitations on the design, such as

- a) the maximum size of emergency loudspeaker zones,
- b) interface requirements to an emergency detection system,
- c) installations in explosive atmospheres.

## 5 Planning

### 5.1 Responsibilities

Planning of the s.s.e.p., including components and usage requirements, shall be undertaken in a systematic process in accordance with a quality system, such as ISO 9001.

### 5.2 Qualifications

The planning of the s.s.e.p. shall be undertaken by persons having qualifications and/or experience relevant to the scope of the particular design requirements.

NOTE National regulations can exist for the registration and recognition of individuals with the requisite qualifications and experience. The recognition can form part of a recognized competency framework.

### 5.3 Documentation

<https://standards.iteh.ai/catalog/standards/sist/822cf82c-020f-4abd-85fd-7c9f813c2b5/iso-7240-19-2007>  
ISO 7240-19:2007

#### 5.3.1 Emergency management plan

A documented emergency management plan for the building or structure shall be prepared. The emergency management plan shall consider the following:

- a) occupancy use of the building or structure;
- b) number of people likely to occupy the building or structure and changes in occupancy levels;
- c) time required to evacuate the building or structure;
- d) need for people to control the evacuation of emergency loudspeaker zones;
- e) need for the use of an alert signal in conjunction with the evacuate signal;
- f) use of phased evacuation (For buildings and structures over 25 m effective height, the alert signal duration and any automatic sequencing of the warning signal should consider horizontal and vertical exiting, occupant characteristics, the building design approach, affected compartments and adjacent compartments as a sequence and management in use principles.);
- g) need for and specification of speech messages (The need and specification should consider agreed scripts and voice characteristics, such as language, dialect and gender, of persons trained in the proper use of microphones, for making the pre-recorded messages.);
- h) s.s.c.i.e. category (see 5.5);
- i) location of equipment, such as emergency microphones, main and remote equipment;

- j) evacuation zone information (When used for non-emergency purposes, the zoning of the loudspeakers may differ from the zones used for emergency purposes. The planning documentation should specify any zoning differences to assist in the system design.);
- k) the physical limits of each emergency loudspeaker zone;
- l) access to the s.s.e.p. (The party requesting the s.s.e.p. should provide an emergency management plan as part of the initial specification. Where the emergency management plan is not available, the designer should develop the emergency management plan in consultation and agreement with the owner and the relevant authorities. The emergency management plan may need to be approved by the relevant authority.).

### 5.3.2 Documentation necessary to prepare design

**5.3.2.1** The designer shall have access to documentation necessary to design the s.s.e.p. in accordance with the requirements of this part of ISO 7240. Documentation shall include the following:

- plans of the building;
- acoustic report, including
  - a schedule of the a.d.a.(s) for each emergency loudspeaker zone (The total area of the a.d.a.(s) within each emergency loudspeaker zone should be equal to the total area of the emergency loudspeaker zone.),
  - predicted or measured reverberation time of each a.d.a. in at least the 500 Hz, 1 000 Hz and 2 000 Hz octave bands,
  - reference ambient noise level in each a.d.a.;
- description of the hazard;
- description of the environmental conditions such as
  - temperature,
  - humidity,
  - corrosive atmosphere,
  - electromagnetic influences (e.g. areas subject to severe thunderstorms);
- description of the environment where the equipment is installed (e.g. occupancy of the building, hazardous locations);
- emergency management plan.

**5.3.2.2** The designer shall state any assumptions made and provide justifications for solutions selected.

## 5.4 System design

**5.4.1** The s.s.e.p. shall permit the broadcasting of intelligible information on measures to be taken for the protection of lives within one or more emergency loudspeaker zones. The audible warning signals shall be distributed throughout the appropriate emergency loudspeaker zones by a system of loudspeakers.