
**Fire detection and alarm systems —
Part 13:
Compatibility assessment of system
components**

Systèmes de détection et d'alarme d'incendie —

Partie 13: Estimation de la compatibilité des composants d'un système

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
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 7240-13:2005), which has been technically revised.

The main changes compared to the previous edition are as follows:

- This edition takes into account new techniques in communication and the availability of new technologies and concepts.
- This edition is applicable to electrical wires, optical fibre or radio frequency connections. The previous edition was only applicable to electrical wires.
- Clarification introduced that it is possible to use this document to establish compatibility with fire protection equipment such as sprinkler flow switches and electrically activated sprinkler heads.
- Levels (field, control and management) and a network transmission path for the basis of system configuration introduced.
- References to EN standards have been replaced with the appropriate IEC standard references.
- Introduction of [Annex A](#), Example of levels used in FDAS.
- Introduction of [Annex B](#), Classification of functions of the FDAS.
- Introduction of [Annex C](#), Example methodology for theoretical analysis.
- Introduction of [Annex D](#), Software design documentation.
- Introduction of [Annex E](#), Flowchart for assessment of compatibility/connectability.
- Introduction of [Annex F](#), previously [Annex A](#), upgraded to the latest fire detection and alarm system functions diagram from ISO 7240-1.

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.

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Introduction

The purpose of fire detection is to detect a fire at the earliest practicable moment and to give signals and indications so that appropriate action can be taken.

The purpose of a fire alarm is, at a minimum, to give audible and/or visible signals to the occupants of a building who may be at risk from fire.

A fire detection and alarm system including voice alarm systems combines the functions of detection and alarm in a single system and typically consists of a number of inter-linked components including automatic fire detectors, manual call points and alarm devices. These components are connected to control and indicating equipment by means of one or more transmission paths. All system components, including the control and indicating equipment, are also directly or indirectly connected to a power supply.

A separate voice alarm system can be assessed for compatibility and connectability independently of the fire detection and alarm system.

ISO 7240-1 provides additional information about the components performing these functions, listed in [Annex F](#) of this document.

A fire protection system and/or building management system, or remote fault and fire alarm monitoring stations that are linked to a fire detection and alarm system, are not considered part of the fire detection and alarm system.

It is necessary for all of the components constituting the fire detection and alarm system to be compatible or connectable and it is necessary that requirements relating to the performance of the overall system be fulfilled.

Differentiation is made between components classified as components type 1 and other components, classified as components type 2.

As the possible configurations of fire detection and alarm systems are unlimited, the assessment is only carried out on the configuration(s) declared by the applicant.

This document recognizes that it is not practical to assess the compatibility or connectability of components in all possible configurations. Methods of assessment are specified to reach an acceptable degree of confidence within pre-determined operational and environmental conditions.

National application guidelines (also known as codes of practice) also contain system requirements.

System requirements are also included for fire detection and alarm systems which are linked to fire protection systems and/or other systems (for example: fire suppression and building management systems).

The intended use of this document is to demonstrate the compatibility and connectability of components, even if they are not defined by an ISO standard.

Fire detection and alarm systems —

Part 13:

Compatibility assessment of system components

1 Scope

This document specifies the requirements for compatibility and connectability assessment of the components of fire detection and alarm systems, fire protection systems and voice alarm systems.

This document only includes system requirements when these are necessary for compatibility assessment.

This document also specifies requirements for the integrity of the fire detection and fire alarm system when connected to other systems.

This document does not specify the manner in which the system is designed, installed and used in any particular application.

This document does not cover components or functions which are not included in the fire detection and alarm systems (FDAS), such as functions performed by a building management system.

Methods of assessment are specified to permit an acceptable degree of confidence within predetermined operational and environmental conditions to be achieved.

The requirements for the transmission path used for a distributed function are covered by a relevant ISO standard and not by this document.

This document is applicable to systems where the components are connected to control-and-indicating equipment (CIE) and where the components are interconnected by electrical wires or optical fibre or by radio frequency links or by any combination of these.

ISO 7240-25 provides additional information and requirements about systems using radio frequency links.

NOTE Other International Standards are expected to cover the requirements of other systems to which the fire detection and fire alarm system is connected.

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

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

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

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

ISO 7240-25, *Fire detection and fire alarm systems — Part 25: Components using radio transmission paths*

IEC 62599-1, *Alarm systems — Part 1: Environmental test methods*

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 Definitions

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

3.1.1

compatibility of the component type 1

ability of a *component type 1* (3.1.2) to operate with control-and-indicating equipment

- within the limits specified for each component,
- within the specified limits given by the relevant parts of the ISO 7240 series or the ISO 6182 series if available and if not available, given by either a National fire equipment standard or by the applicant,
- within specified configurations of systems

3.1.2

component type 1

device performing a function for the protection of life and/or property, which is required by national guidelines or regulations

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3.1.3

component type 2

device other than a type 1 device which is connected to a *component type 1* (3.1.2) performing a function for the protection of life and/or property, which is not required by national guidelines or regulations

EXAMPLE A printer used for listing fire events.

3.1.4

configuration

topological arrangement of components connected through transmission paths to a control and indicating equipment

3.1.5

connectability of component type 2

ability of a *component type 2* (3.1.3) to operate without jeopardizing the performance of the fire detection and fire alarm system

3.1.6

control level

level where control and indication functions are provided

Note 1 to entry: See [Figure A.1](#).

Note 2 to entry: CIE and VACIE belong to this level.

3.1.7

field level

level where detection, activation and fire alarm functions are provided

Note 1 to entry: See [Figure A.1](#).

Note 2 to entry: Detectors, input/output devices and visual/audible alarm devices belong to this level.

3.1.8

fire protection system

group of devices, which in combination are capable of automatically actuating measures to limit the effect of fire

EXAMPLE Compartmentalization systems, smoke control systems, fixed fire-fighting systems.

3.1.9

hierarchical system

networked system in which one item of control-and-indicating equipment is designated as the main control-and-indicating equipment, and in which the main control-and-indicating equipment is able to

- receive signals from and/or transmit signals to the control-and-indicating equipment of a subsystem, and
- indicate the status of the control-and-indicating equipment of a subsystem

3.1.10

management level

level where management functions are provided

Note 1 to entry: The FDAS shall not depend on these functions for its operation.

3.1.11

networked CIE

fire-detection and fire-alarm system in which more than one CIE or VACIE or a combination are interconnected on a fault tolerant transmission path and are able to exchange information

3.1.12

applicant

organization or other such body requiring an assessment of the compatibility and connectability of system components

3.2 Abbreviated terms

CIE	control-and-indicating equipment
FDAS	fire detection and fire alarm system
PSE	power supply equipment
TP	transmission path
VACIE	voice alarm control and indicating equipment
VAS	voice alarm system

4 Requirements

4.1 Conformance

The components shall conform to the requirements of the ISO 7240 series or the ISO 6182 series or with a national equipment standard or with a manufacturer's specification where a standard is not available.

National application guidelines (also known as codes of practice) also contain system requirements. Suppliers of components shall ensure that they

- meet the requirements of this document;

- meet the requirements of the application guidelines of the countries where the components are intended to be placed on the market.

In order to conform to this document, compatibility of the components type 1 or connectability of the components type 2 within the FDAS shall meet the requirements listed in [Clause 4](#) of this document. This shall be verified by theoretical assessment ([5.1](#)) with reference to the required documentation ([Clause 8](#)). When it is an outcome of the theoretical assessment, configuration(s) according to [5.3](#) shall be tested as described using the relevant selection of functional tests defined in [5.5](#) and [5.6](#) and shall meet the acceptance criteria of the tests.

4.2 General system requirements

4.2.1 The applicant shall provide a list of the FDAS devices and those devices not covered by the ISO 7240 series shall be declared as component type 1 or component type 2.

4.2.2 The different FDAS configurations intended to be used shall be described within the applicant's documentation.

4.2.3 Each of the configurations declared by the applicant shall be considered and representative configurations shall be assessed to meet the requirements of this document.

4.2.4 Each component type 1 shall be powered directly or indirectly by a PSE which conforms to the requirements in ISO 7240-4, except for some radio link components in accordance with ISO 7240-25 which may be powered by batteries.

4.2.5 Each component type 1 shall meet the requirements of the relevant part of the ISO 7240 series or the ISO 6182 series.

Where the component type 1 is not covered by a relevant part of ISO 7240 series or the ISO 6182 series, it shall meet the following criteria:

- a) conformity of the functionality (indication, control, activation) as declared by the component manufacturer: this functionality shall be consistent with the purpose of a FDAS. The applicant shall provide the means to check the functionality;
- b) conformance to IEC 62599-2;
- c) conformance to IEC 62599-1; the applicant shall declare the environmental class. The measurements or inspections are made before, during (if necessary) and after testing. There shall be no change in the functioning of the equipment and no significant change in any measurements, which shall also remain within specification.

Alternatively, the component may comply with the environmental clauses included in the relevant part of the ISO 7240 series (refer to ISO 7240-1 to classify the components and select the appropriate part).

NOTE It is possible for a component to be covered by a National Assessment Document where there is not an ISO 7240 standard.

4.2.6 The operation of type 1 and type 2 components shall not jeopardize the operation of the system.

4.2.7 Each component within the FDAS shall operate correctly when submitted to supply voltage variation as specified by the manufacturer. For each configuration, voltage shall be within the specified voltage supply range of each component in the FDAS.

4.3 Transmission path(s) (TP)

4.3.1 General

Each TP between components shall be realized as one of or a combination of the following: electrical cables, radio frequency links or fibre optic cables.

Means, specified and provided, of limiting the consequences of faults on a transmission path shall ensure that the function of remaining operational devices is re-established within 300 s following the occurrence of the fault.

Application guidelines may require that the consequences of a fault (for example a short circuit or an interruption) on a transmission path are limited: for example, not losing more than one function or limiting the maximum area affected by the fault.

4.3.2 TP using wires

The applicant shall define in the installation documentation the arrangement of the TP and if the TPs may be combined in one cable.

A single short or open or earth fault in any TP between components of the FDAS shall not affect the correct functioning of any other TP.

A short, open or earth fault on a TP to any other system shall not affect the correct functioning of the FDAS.

4.3.3 TP using radio frequency links

The applicant shall define in the installation documentation the arrangement of the TP using radio frequency links. The component type 1 using radio frequency links shall comply with the requirements of ISO 7240-25.

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4.3.4 TP using optical fibres

The applicant shall define in the installation documentation the arrangement of the TP and whether or not the TPs may be combined in one cable.

A single fibre break or loss of transmission within a cable shall not affect more than one TP.

A fibre break or loss of transmission on a transmission path to any other system shall not affect the correct functioning of the FDAS.

4.3.5 Network TP

The network technology of networked CIE could be either a wired link, fibre optics or radio.

The following requirements shall apply:

- a) the connection to the network and any single short, open or earth fault in the network shall not jeopardize the correct operation of the FDAS (in the specified configuration);
- b) any traffic on the network shall stay within the limits defined by the applicant and shall not jeopardize the correct operation of the FDAS;
- c) the access to the CIE through the network shall comply with the requirement of the access levels defined in the relevant part of the ISO 7240 series;
- d) if the configuration is designed to transmit a functional condition (such as fire, fault, disablement, etc.) from one CIE to any other CIE through the network, then the transmission time shall be determined by the applicable product standard forming part of the ISO 7240 series. However, where this is not the case, the transmission time shall be within 20 s;

- e) if the configuration is designed to transmit an activation message(s) from one CIE to any other CIE through the network, then the transmission time shall be within 20 s and the relevant output shall be activated at the other CIE as specified in ISO 7240-2 or ISO 7240-16;
- f) if the configuration is designed to transmit a fire alarm, fault warning or disablement condition from one CIE to any other CIE through the network, it shall be possible to identify at least the CIE from which the information originated;
- g) a loss of communication to a network CIE shall cause at least one CIE to enter the fault warning condition within 100 s. In the case of a hierarchical system, the main CIE shall enter the fault warning condition within 20 s of the original fault warning condition;
- h) if it is possible to remotely control one CIE from another CIE via the network, the result shall be identical to that achieved by the operation of these controls on the controlled CIE.

5 Assessment methods and tests

5.1 General

5.1.1 To assess the compatibility or connectability, a theoretical analysis shall be undertaken for each component and its type of transmission path.

Based on the theoretical analysis of the system, a set of tests shall be selected from those listed in [Clause 5](#).

If requirements defined in [Clause 4](#) are included in the applicable part of the ISO 7240 series, no further testing is required.

NOTE 1 An example of the methodology for the theoretical analysis is given in [Annex C](#).

NOTE 2 A flow chart to illustrate the process for implementing the compatibility assessment is given in [Annex E](#).

The compatibility or connectability of each component for each system configuration(s) as specified by the applicant shall be assessed.

5.1.2 For components type 1 not covered by the ISO 7240 series, if no evidence of conformance to electromagnetic compatibility [see [4.2.5 b](#))] is provided, then the electromagnetic compatibility immunity tests shall be carried out in accordance with [4.2.5 b](#)).

5.1.3 For components type 1 not covered by the ISO 7240 series, if no evidence of conformance to environmental tests [see [4.2.5 c](#))] is provided, then tests shall be carried out in accordance with [4.2.5 c](#)).

5.1.4 The test programme shall be undertaken after the theoretical analysis and be dependent upon the results of this analysis.

The test programme may be undertaken as part of a programme to assess the performance of a device in accordance with the relevant part of the ISO 7240 series.

5.1.5 The assessment of the software documentation of components type 1 not covered by the ISO 7240 series shall be carried out in accordance with [Annex D](#).

5.1.6 The assessment shall be based on the assumption of the initial condition of the system being in the quiescent state.