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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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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 7240-13 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 3, *Fire detection and alarm systems*.

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 11: Manual call points*

— *Part 12: Line type smoke detectors using a transmitting light 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]

— *Part 15: Multisensor fire detectors*

— *Part 21: Routing equipment*

— *Part 22: Duct sampling equipment*

The following part is under preparation:

— *Part 9: Test fire for fire detectors* [Technical report]

Introduction

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

The fire alarm function is at least 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 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 sounders. 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.

ISO 7240-1 provides additional information about the components performing those functions that are listed in Annex A of this part of ISO 7240.

A fire protection and/or building management systems 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.

All the components constituting the fire detection and alarm system need to be compatible or connectable and requirements relating to the performance of the overall system need to be fulfilled.

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

This part of ISO 7240 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. Suppliers of components shall ensure that they

⎯ meet the requirements of this part of ISO 7240;

⎯ meet the requirements of the relevant part of ISO 7240; and

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

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

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Fire detection and alarm systems —

Part 13:
Compatibility assessment of system components

1   Scope

This part of ISO 7240 specifies the requirements for compatibility and connectability assessment of system components that either comply with the requirements of ISO 7240 or with a manufacturer's specification where there is no ISO 7240 International Standard. This part of ISO 7240 includes only system requirements when these are necessary for compatibility assessment.

This part of ISO 7240 also specifies requirements for the integrity of the fire detection and fire alarm system when connected to other systems.

This part of ISO 7240 does not specify the manner in which the system is designed, installed and used in any particular application.

This part of ISO 7240 is applicable to systems where the components are connected to control-and-indicating equipment (c.i.e.) and where the components are interconnected by electrical wires. For fire detection and fire alarm systems using other means of interconnection (for example optical fibre or radio frequency links), this part of ISO 7240 may be used as guidance.

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

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, *Fire detection and alarm systems — Part 1: General and definition*

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

ISO 17025, *General requirements for the competence of testing and calibration laboratories*

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

EN 50130-4, *Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder and social alarm systems*

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3 Terms, abbreviated terms and definitions

3.1 Definitions

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

3.1.1
compatibility
ability of a component type 1 to operate with control-and-indicating equipment

— within the limits specified for each component,

— within the specified limits given by the relevant parts of ISO 7240 if available or given by the manufacturer if not available,

— 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

3.1.3
component type 2
device 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
ability of component type 2 to operate without jeopardizing the performance of the fire detection and fire alarm system

3.1.6
fire detection and fire alarm system
group of components including a c.i.e. which, when arranged in (a) specified configuration(s), is capable of detecting, indicating a fire and giving signals for appropriate action

3.1.7
fire protection system
group of devices, which in combination is capable of automatically actuating measures to limit the effect of fire

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

3.1.8
hierarchical system
networked system in which one 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,

— indicate the status of the control-and-indicating equipment of a subsystem

3.1.9
input/output device
device, which is connected to a transmission path of a fire detection and fire alarm system and is used to receive and/or transmit information to, from or within the system

3.1.10
networked system
fire-detection and fire-alarm system in which more than one control-and-indicating equipment are interconnected and able to exchange information

3.1.11
sub system
part of a hierarchical system that includes only one control-and-indicating equipment

3.1.12
transmission path
physical connection between the components (external to the housing of the components) used for the transmission of information and/or power

3.2 Abbreviation terms

— c.i.e.   control-and-indicating equipment

— f.d.a.s.   fire detection and fire alarm system

— f.p.s.   fire protection system

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4 Requirements

4.1 Compliance

The system and the compatibility or connectability of its components shall meet the requirements of this clause. Verification shall be by assessment (see 5.1) with reference to the required documentation (see 4.7), shall be tested (if necessary) as described in 5.2 to 5.4 and shall meet the requirements of the tests.

4.2 General system requirements

4.2.1   The f.d.a.s. under consideration shall carry out fire detection functions identified in Annex A. All the different system configurations intended to be used shall be mentioned within the supplier documentation and shall comply with this part of ISO 7240.

4.2.2   If a function of an f.d.a.s. is shared with any other system, the function shall not jeopardize the f.d.a.s. Common facilities shall meet the most onerous requirements of the relevant specifications.

4.2.3   If a non-f.d.a.s. function is performed by a component of an f.d.a.s., the function shall not jeopardize the f.d.a.s.

4.3 Networked systems

4.3.1 General

4.3.1.1   A system fault (as described in ISO 7240-2) in one c.i.e. shall not affect more than this c.i.e. and the associated components controlled by this c.i.e.

4.3.1.2   A single fault on a transmission path connecting one c.i.e. to another c.i.e. shall not adversely affect the correct functioning of any part of the networked system.

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4.3.1.3 Means shall be provided for the indication of a fault on a transmission path connecting one c.i.e. to another c.i.e.

4.3.2 Hierarchical systems

Where c.i.e. are interconnected to form a hierarchical system, the following shall apply.

— A fire alarm condition on a c.i.e. shall be indicated on the main c.i.e. within 20 s.

— A fault warning condition on a c.i.e shall be indicated on the main c.i.e. within 120 s.

— A fault or faults in a single transmission path connecting one or more c.i.e. to the main c.i.e. shall not adversely affect the mandatory (as defined in ISO 7240-2) functions of the hierarchical system.

— A fault on a transmission path connecting a c.i.e. to the main c.i.e. shall be at least indicated on the main c.i.e.

— Where faults exist in more than one transmission path connecting one or more c.i.e. to the main c.i.e., the main c.i.e. shall clearly indicate which part is lost or parts are lost.

— The main c.i.e. shall indicate at least general conditions (see conditions defined in ISO 7240-2; example: a fire condition at a subsystem c.i.e.). If detailed information (example: a fire condition on a zone of a subsystem c.i.e.) is provided, then it shall be consistent throughout the system.

— At the main c.i.e., it shall be possible to identify the subsystem from which the information originated.

— At the main c.i.e., it may be possible to operate either general manual controls or individual manual controls, but the result shall be identical to that achieved by the operation of these controls on the c.i.e. of the subsystem.

NOTE Where faults exist in more than one transmission path connecting one or more c.i.e. to the main c.i.e., the mandatory (as defined in ISO 7240-2) functions of the hierarchical system can be affected. In that case, it is preferable to connect the device type E (ISO 7240-1) directly to each c.i.e.

4.3.3 Software

Any software that is needed for networking shall comply with ISO 7240-2:2003, Clause 14 regarding additional design requirements for software-controlled c.i.e.

4.4 Components

4.4.1 Classification

4.4.1.1 The components of the system are classified as component type 1 or component type 2, as defined in 3.1.2 and 3.1.3. Annex C provides additional guidance.

4.4.1.2 If a component includes one or more controls which perform functions described in ISO 7240-2 as being mandatory, or an optional function with requirements at the c.i.e., then the device shall be classified as a component type 1.

4.4.2 Requirements

4.4.2.1 To be compatible, components type 1 shall operate within the specified limits given by the relevant part of ISO 7240, within specified system configurations and within the limits specified for each component.

4.4.2.2 Components type 1, not covered by a product International Standard, shall also comply with EN 50130-4 for EMC immunity characteristics.

4.4.2.3 To be connectable, a component type 2 shall operate without jeopardizing the operation of the system.

4.4.2.4 The operation of a remote control shall have the same effect as if the operation had been undertaken at the c.i.e.

4.5 Transmission path(s)

4.5.1 A single fault on a transmission path shall not affect another transmission path. If this is not the case, then all transmission paths adversely affected by this single fault shall be considered as a single transmission path.

4.5.2 The facility (technical means) provided for minimizing the effect of a fault on a transmission path shall complete the restoration of the effect of the fault within 300 s.

4.5.3 The consequence of a single interruption shall not be more serious than the consequence of a short circuit.

4.5.4 A fault on a transmission path to any other system shall not adversely affect the correct functioning of the f.d.a.s.

NOTE Application guidelines can require that the consequences of a fault (for example a short circuit or an interruption) on a transmission path are limited.

4.6 Input and output devices linked to a fire protection system

4.6.1 General requirements

Input and output devices linked to a fire protection system shall be considered as component type 1.

The documentation shall include the specifications of the input/output signals of each input/output device.

NOTE The transmission path between the systems is monitored either by the f.d.a.s. or by the f.p.s. Details should be included within the documentation.

The fire detection and fire alarm system shall include the whole of the input device transferring signals from the fire protection system to the fire detection and fire alarm system and the whole of the output device transferring signals from the fire detection and fire alarm system to the fire protection system. Figure 1 shows this arrangement.