INTERNATIONAL STANDARD

ISO 7240-13

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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

Reference number
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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).

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*

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

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.

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

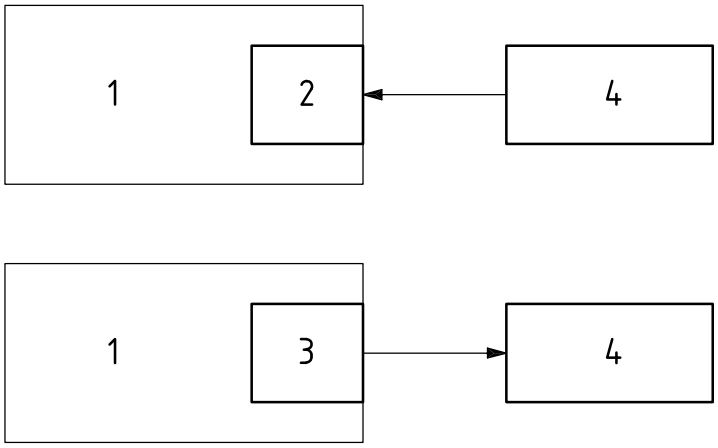
4.6.1 General requirements

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.



Key

1 fire detection and fire alarm system
2 input device
3 output device
4 fire protection system

Figure 1 — Input and output devices associated with a fire protection system

4.6.2 Input device transferring signals from a fire protection system

If a device of a f.p.s. passes signals to the f.d.a.s., then the c.i.e. of the f.d.a.s. shall enter the appropriate functional condition. Signals from the f.p.s. shall be clearly identifiable as originating from the f.p.s. Examples include the following.

— Input devices may transfer signals of a fire detected by a sprinkler system; this is indicated as a fire alarm condition.

— Input devices may transfer signals of a fault in the wiring of a fixed firefighting system; this is indicated as a fault warning condition.

4.7 Documentation

4.7.1 General

The system documentation shall include documentation for compatibility and, if necessary, for connectability.

NOTE Documentation, prepared by the supplier, allows the testing authority to make the assessment of compatibility and connectability within the configuration(s) defined by the supplier.

4.7.2 Documentation for compatibility

To allow the assessment of compatibility of a f.d.a.s. to be completed, the following documents shall be supplied:

a) list of the types of components making up the f.d.a.s with a unique identification of each component including software versions;

b) technical information facilitating the justification of the compatibility;

c) necessary evidence (for example, test reports or certificate of conformity) for the compliance of the components to the relevant part of ISO 7240;

d) characteristics of the transmission path(s) between each component and the c.i.e., including the specifications of cables;

e) limitations of use of the system (configuration, number of components, functional limits, etc.).

4.7.3 Documentation for connectability

To allow the assessment of connectability to be completed, the following documents shall be supplied:

a) list of the types of components intended to be used in conjunction with the f.d.a.s., with a unique identification of each component and also its functions. If software is involved in connectability, the unique identification shall include the software version. If a component type 2 is connected through a common standardized interface, the unique identification is not needed;

b) technical information facilitating the justification of the connectability of component type 2;

c) characteristics of the transmission path(s) between each component and the c.i.e., including the specifications of cables;

d) limits of use of the system (configuration, number of components, functional limits etc.).

4.7.4 Software documentation

4.7.4.1 If in addition to the software used for the component, the system functionality needs the implementation of additional software, this software shall be documented in accordance with ISO 7240-2:2003, Clause 14.

4.7.4.2 A list of the software versions used in the different system configuration(s) shall be supplied.

5 Assessment methods

5.1 To assess the compatibility or connectability, a theoretical analysis shall be undertaken for each component and its type of transmission path, and the result shall indicate whether a functional test is necessary (an example of the methodology for the theoretical analysis is given in Annex B). The compatibility or connectability of each component shall be assessed in the specified system configuration(s).

5.2 The electromagnetic compatibility immunity tests shall be carried out if the theoretical analysis clearly indicates that EMC immunity tests are necessary. Testing is not necessary if each individual component complies with the electromagnetic compatibility requirements included in the relevant product standard and the same cable and its termination requirements specified by the relevant manufacturer are used.

5.3 The test program shall be undertaken after the theoretical analysis and will be dependant upon the results of this analysis.

5.4 The test program may be undertaken as part of a program to assess the performance of a device according to a part of ISO 7240.

6 Tests

6.1 General

6.1.1 Atmospheric conditions for tests

Unless otherwise stated in a test procedure, the testing shall be carried out after the test specimen has been allowed to stabilize in the standard atmospheric conditions for testing as specified in IEC 60068-1 as follows:

— temperature: (15 to 35) °C;

— relative humidity: (25 to 75) %;

— air pressure: (86 to 106) kPa.

The temperature and humidity shall be substantially constant for each environmental test where the standard atmospheric conditions are applied.

6.1.2 Mounting and electrical connection

6.1.2.1 The components shall be mounted by the normal means of mounting indicated by the manufacturer.

6.1.2.2 The input and output connections shall be made in accordance with the manufacturer's instructions.

6.1.2.3 If more than one type of cable is specified, each test shall be carried out with the one considered to be the least favourable.

6.2 Compatibility

6.2.1 Objective of test

To check the compliance of the components in a defined configuration covered by the specifications given by the manufacturer and within the limits given in the relevant parts of ISO 7240.

6.2.2 Test schedule

6.2.2.1 A test schedule shall be drawn up, in order to check if the components exercise their functions (fire alarm, fault warning, disabled condition, test condition etc.) correctly within the specifications given by the manufacturer and the relevant part of ISO 7240. The components shall be fully operational.

6.2.2.2 During testing, implemented functions of the f.d.a.s. shall be activated in sequence (except when a different order is specified).

6.2.2.3 Each functional test shall be carried out at

a) the minimum supply voltage of the c.i.e. with the maximum load on all transmission paths,

b) the maximum supply voltage of the c.i.e. with the minimum load on all transmission paths.

NOTE 1 The load includes the number of components and the length of the cables.

NOTE 2 The maximum load on all transmission paths means that at least one transmission path is fully loaded. The other transmission path(s) can either be fully loaded or have their load simulated. Where this is impractical, especially in networked or hierarchic systems, a manufacturers declaration might also be required.

NOTE 3 The minimum load on all transmission paths means that at least one transmission path is loaded with one component under consideration and there is no load on the other transmission path(s) unless it is necessary for the functional test.

6.2.2.4 During each of the following conditions, the power and/or data parameters on the transmission path shall be within the manufacturer's specifications for the connected components.

6.2.3 Fire alarm condition

6.2.3.1 Procedure

Starting from the quiescent condition, activate and reset one or more of the components (detector, manual call point or input element) that can be connected to the transmission path in accordance with the manufacturer's instructions under the conditions specified in 6.2.2.

6.2.3.2 Requirements

The following requirements shall apply.

a) The activation of one component or two components simultaneously (if it is technically possible for two components to simultaneously enter the fire-alarm status) with subsequent activation of further components shall lead to the fire alarm condition of the system.

b) Resetting shall return the system to the quiescent condition.

6.2.4 Fault warning condition

6.2.4.1 Procedure for open circuit on a transmission path — Optional assessment

6.2.4.1.1 General

Starting from the quiescent condition, influence the transmission path by means of serial resistances, to ascertain the line parameters at which a fault is signalled at the c.i.e. The serial resistance which causes the fault is called R_{Sfault}.

NOTE Some systems use the transmission path to drive a building-occupant warning system. For these systems, the assessment of S_{fault} might not be valid due to the high variability of the load.

Starting from the quiescent condition, increase the serial resistance to $0{,}9 \times R_{\text{Sfault}}$.

6.2.4.1.2 Requirements

The following requirements shall apply.

a) The fault shall cause the intended fault warning condition of the system.

b) At a line resistance of $0{,}9 \times R_{\text{Sfault}}$, the components connected to the transmission path shall be fully operational.

6.2.4.2 Procedure for short circuit on a transmission path – Optional assessment

6.2.4.2.1 General

Starting from the quiescent condition influence the transmission path by means of parallel resistances, to ascertain the line parameters at which a fault is signalled at the c.i.e. The parallel resistance which causes the fault is called R_{Pfault}.

NOTE Some systems that use the transmission path to drive a building occupant warning system. For these systems, the assessment of P_{fault} might not be valid due to the high variability of the load.

Starting from the quiescent condition, decrease the parallel resistance to $1{,}1 \times R_{\text{Pfault}}$.

6.2.4.2.2 Requirements

a) The fault shall cause the intended fault warning condition of the system.

b) At a line resistance $1{,}1 \times R_{\text{Pfault}}$, the components connected to the transmission path shall be fully operational.

6.2.4.3 Procedure for interruption of mains power supply

6.2.4.3.1 General

Starting from the quiescent condition, disconnect the mains voltage.

Reduce the battery voltage by discharge of the battery or by simulation until

a) activation of a deep discharge protection device and followed by reconnection to the mains line supply,

or

b) the voltage reaches a level below which the system does not operate and followed by reconnection to the mains line supply.

The simulation of a reduction of the battery voltage shall not be at a rate greater than 0,4 V/min.

6.2.4.3.2 Requirements

The indication of the fire alarm condition shall not be activated and the outputs to fire alarm devices (item C of Figure A.1), to fire alarm routing equipment (item E of Figure A.1) and to fire protection equipment (item G of Figure A.1) shall not be activated.

After reconnection to the mains supply and, if necessary, the resetting of a deep discharge protection device, the system shall return to the intended functional condition (except fire alarm condition).

NOTE The intended functional condition is one of those mentioned in ISO 7240-2 and is specified in the manufacturer‘s documentation.

6.2.5 Disablement condition

6.2.5.1 Procedure

Starting from the quiescent condition, disable and re-enable one or more different system components or system parts (for example: detectors, detector zones and transmission path, etc).

6.2.5.2 Requirements

The following requirements shall apply.

a) Disablement shall cause the intended disablement condition of the system.

b) Disabled system components or system parts shall no longer have a functional effect on the system.

c) After re-enablement, the system part or component shall function again as intended.

6.2.6 Test condition (if provided)

6.2.6.1 Procedure

Starting from the quiescent condition, activate the test function for various system parts or components provided for this purpose (e.g. detectors, detector zones).

6.2.6.2 Requirements

The following requirements shall apply.

a) Activation shall cause the intended test condition of the system.

b) System parts or components for which the test function is activated shall function as intended under this state. After de-activation of the test function, the appropriate part of the system or component shall again be fully operational.

6.3 Connectability

6.3.1 Objective of test

To check that the component type 2 used in conjunction with the f.d.a.s. in a defined configuration covered by the specifications given by the manufacturer does not jeopardize the f.d.a.s..

6.3.2 Test schedule

6.3.2.1 A test schedule shall be drawn up in order to check that the components type 1 (including c.i.e.) of the f.d.a.s. function satisfactorily when the component type 2 is used.

During testing, implemented functions of the f.d.a.s. shall be activated in sequence (except if a different order is specified).

6.3.2.2 Each functional test shall be carried out under the same condition specified in 6.2.2.3.

6.3.3 Procedure

Starting from the quiescent condition or fire alarm condition, activate and reset one or more of the functions included in the component type 2 which can be connected to the transmission path, in accordance with the manufacturer's instructions under the conditions specified in 6.3.2.

6.3.4 Requirements

The following requirements shall apply.

a) The activation (or the failure) of the component type 2 shall not prevent the correct functioning of the other components type 1 of system.

b) The failure of component type 2 may cause the fault warning condition of the system.

c) Information concerning conditions of the f.d.a.s. delivered by the components type 2 shall not be in conflict with that given by components type 1.

6.4 Electromagnetic compatibility tests

6.4.1 Objective of test

To check that the functioning of the system is not adversely affected by electromagnetic interference.

6.4.2 Test schedule

The test schedule shall be selected from those defined for components within the relevant International Standard.

The test shall be conducted together with the component(s) to which the system is connected according to the defined configuration.

6.4.3 Requirements

The correct functioning of the system shall not be adversely affected.

7 Test report

The test report shall contain as a minimum the following information:

a) identification of the components tested;

b) reference to this part of ISO 7240;

c) results of the test: the individual threshold values and the minimum, maximum, and arithmetic mean values where appropriate;

d) conditioning period and the conditioning atmosphere;

e) temperature and the relative humidity in the test room throughout the test;

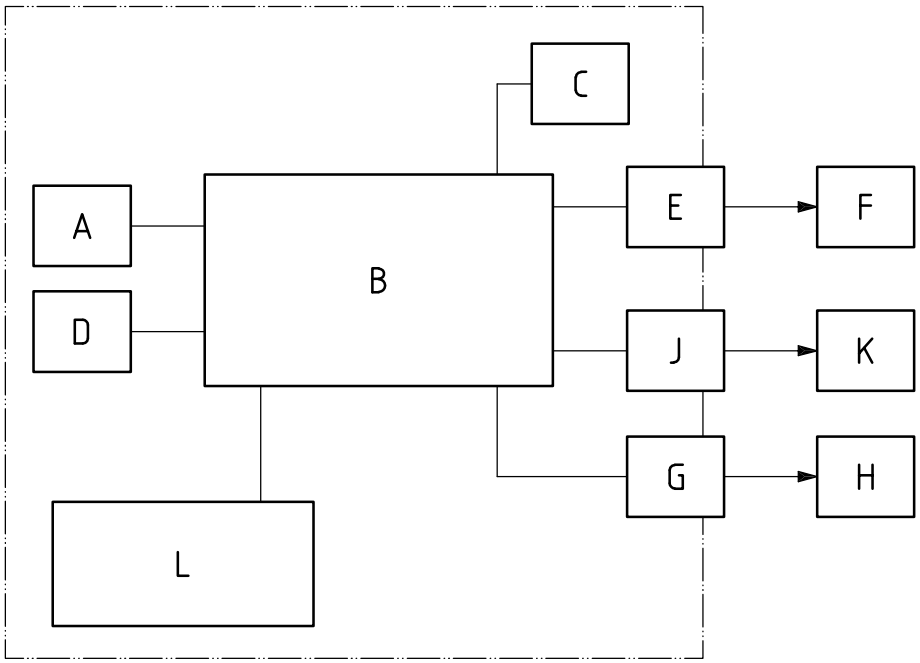
f) details of the supply and monitoring equipment and the alarm criteria;

g) details of any deviation from this part of ISO 7240 or from the International Standards to which reference is made, and details of any operations regarded as optional.

Annex A
(normative)

Functions of a fire detection and fire alarm system

Figure A.1 is based on ISO 7240-1 but refers to functions and is not intended to represent physical components. It shows the functions that are included within an f.d.a.s. (functions included in the dotted line). Where the functions bridge the dotted line they are shared between the f.d.a.s. and another system.



Key

A automatic fire detection function
B control and indicating function
C fire alarm function
D manual initiating function
E fire alarm routing function
F fire alarm receiving function
G control function for automatic fire protection function
H automatic fire protection function
J fault warning routing function
K fault warning receiving function
L power supply function

Figure A.1 — Functions of a fire detection and fire alarm system

Annex B
(informative)

Method for theoretical analysis

B.1 Introduction

The components forming a f.d.a.s. are each designed to provide a system with a particular aspect of its overall functionality. Only when all the components are connected together is the system likely to perform in the desired manner and then only if the components intercommunicate effectively.

For the purposes of this part of ISO 7240, the c.i.e. is the focal point of the system and all other components are required to communicate effectively with the c.i.e. Not only does Communication require communication protocols, but other aspects, such as power supply requirements and data transmission characteristics, should also be considered.

B.2 Method of test

B.2.1 General

The theoretical analysis should commence with a review of the system configuration documentation. The objective of the review is to understand the most onerous configurations and analyse their performance. A structured approach should then be followed which analyses at least the following characteristics:

— mechanical connections;

— power supply;

— data exchange;

— functionality;

— electromagnetic compatibility.

As far as possible, the analysis should be undertaken in the order stated. However, environmental compatibility should be considered throughout the analysis process and additional analysis may be considered necessary.

B.2.2 List of characteristics

B.2.2.1 Mechanical connections

Consider whether the mechanical arrangements for the termination of the transmission path and its connection to the component compatible with the cable and any accessories are specified for the transmission path.

B.2.2.2 Power supply and distribution analysis

B.2.2.2.1 Voltage range

Consider whether

— the maximum voltage of the power supply under all load conditions is less than or equal to the maximum specified voltage of the powered components;

— the minimum voltage provided by the power supply under all load conditions is greater than or equal to the minimum voltage of the powered component, taking into account the effects of voltage drops within transmission paths.

B.2.2.2.2 Current

Consider whether the current available from the power supply circuit is adequate to meet the maximum demands and that appropriate measures are taken to limit the current that can flow throughout the circuit to a safe level.

B.2.2.2.3 Supply characteristics

Consider whether the component is able to function correctly with the supplied power, i.e. it will operate with the power supply's worst case characteristics of output frequency, modulation, distortion and phase angle.

B.2.2.2.4 Tolerances

Consider whether the components operate satisfactorily when they are subjected to worst-case tolerances of the power supply. At least the likely effect of environmental temperature and input voltage variations tolerances should be taken into account.

B.2.2.2.5 Fault performance

Consider whether a short circuit fault occurring on a transmission path used for power distribution will be handled in an acceptable manner, e.g. that appropriate current-limiting components are provided to prevent unacceptable losses of power during conditions of current overload.

B.2.2.3 Data exchange analysis

B.2.2.3.1 General

All active components connected to transmission paths rely on data being received or transmitted to perform their functions. The data may be exchanged on the same transmission path as the power supply or may be exchanged via a separate transmission path. The analysis, however, should follow the same method in both cases.

B.2.2.3.2 Transmission characteristics

B.2.2.3.2.1 General

Consider whether the electrical characteristics of the transmission signals are compatible with the requirements for the successful reception of the data by other components on the transmission path. At least the following characteristics should be analysed.

B.2.2.3.2.2 Voltage range

Consider whether

— the maximum transmitted signal voltage under all normal load conditions is less than or equal to the maximum specified voltage of the receiving components;

— the minimum transmitted signal voltage under normal load conditions is greater than or equal to that specified for the receiving components, taking into account the effects of voltage drops within transmission paths.

B.2.2.3.2.3 Current

Consider whether

— the signal current flowing as a result of the operation of the transmitting component is adequate to meet the demands of the receiving components;

— adequate signal current-limiting facilities are provided to protect components against overcurrent conditions.

B.2.2.3.2.4 Timing

Consider whether the time-related characteristics of the transmitted signals is within the limits of those required by the receiving components.

B.2.2.3.2.5 Distortion/phase angles

Consider whether the impedance characteristics regarding distortion and phase angles specified for the transmission path are compatible with the values specified for the receiving component by the manufacturer under all load conditions.

B.2.2.3.2.6 Tolerances

Consider whether the receiving components are able to successfully receive the data even under worst-case tolerances of the transmitted data and transmission path characteristics.

B.2.2.3.2.7 Fault performance

Consider whether a fault, either open- or short-circuit occurring on a transmission path, will be processed as required in this part of ISO 7240.

B.2.2.3.3 Transmission protocol(s)

Consider whether

— the data being exchanged between components on the transmission path is in a format that permits all components to effectively transmit and/or receive relevant data;

— there is a protocol for each transmission path that will permit all the components on the transmission path to exchange data and functions as specified.

B.2.2.4 Functionality

B.2.2.4.1 General

All components connected on a transmission path should have a defined functionality that is specified in supporting documentation.

B.2.2.4.2 Received data

Consider whether the data received by the component is sufficient to permit it to perform as specified in the supporting documentation.

B.2.2.4.3 Transmitted data

Consider whether the data transmitted by the component are sufficient to permit other components on the same transmission path to perform as specified in the supporting documentation.

Annex C
(informative)

Classification of functions of the fire detection and fire alarm system

C.1 Objective

The purpose of this annex is to assist the classification of the components as type 1 or type 2.

C.2 Fire detection function

All detectors (for example heat, smoke, flame, gas, point- or line type) and manual call points should be considered as being essential and therefore be classified as component type 1. All forms of components that allow the detectors to operate, such as short-circuit-isolators, the interface to connect spur-wired detectors to a loop, etc. should be classified as component type 1.

C.3 Fire alarm function

C.3.1 Alarm to occupants in the premises

The alarm to occupants in the premises is an essential function; so all components, such as sirens, voice sounders, voice alarm components, etc., performing an alarm for people should be classified as component type 1.

When the alarm is passed through mobile telephones or pagers, an output device is needed which is classified as component type 1; but all elements connected such as computers, telephone switch boards, recorders for the messages are not considered as part of the f.d.a.s.

C.3.2 Alarm to summon external assistance (usually the fire brigade)

If the f.d.a.s. is configured to summon an external organization, then the component should be classified as component type 1.

C.4 Activation of fire protection function

C.4.1 Equipment directly triggered by the f.d.a.s.

The output function (terminals of the c.i.e. or output device) used for control of door hold-open devices, closing dampers, smoke ventilation, ventilation control, etc., are regarded as essential. Each component used for triggering such equipment should be classified as component type 1.

C.4.2 System driven by the information coming from the f.d.a.s.

The output devices driving fire-extinguishing systems, the smoke-control system, the compartment system, the release of access-control system, etc., are regarded as essential. Each component used for triggering such a system should be classified as component type 1.

C.5 External indication 1 (remote panels, fire brigade panels, etc.)

The classification component type 1 or component type 2 may depend on local regulations.

Fire-brigade panels should be classified as component type 1 if a fire-brigade panel is a mandatory component.

Remote panels should be classified as component type 1 if the c.i.e. is in a separate location somewhere in the building and the remote panel is the usual way to access the information.

Remote panels should be classified as component type 2 when they are used to provide redundant information, for example a panel located in the office of the building manager.

C.6 External indication 2 (printers, building management systems, etc.)

Non-emergency items should be classified as component type 2.

EXAMPLE Devices used to transmit information to the building management system or to all other non-security applications.

C.7 Input function

Devices performing an input function should be classified as component type 2. Such devices should be classified as component type 1 if they are used to receive fire-alarm information coming from other kinds of detection such as a sprinkler system.

C.8 Output function

Devices performing an output function should be classified as component type 2. Such devices should be classified as component type 1 if they are used to send fire alarm information to the fire protection system.

C.9 Connection devices between transmission paths (gateway, etc.)

Connection devices between transmission paths should be classified as component type 1.

NOTE It is not necessary to consider junction boxes as component type 1 or type 2.

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