INTERNATIONAL STANDARD

ISO 7240-1

Second edition
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Fire detection and alarm systems —

Part 1: General and definitions

Systèmes de détection et d'alarme d'incendie —

Partie 1: Généralités et définitions

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 7240-1 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 7240-1:1988), which has been technically revised.

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 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]

— *Part 15: Point type fire detectors using scattered light, transmitted light or ionization sensors in combination with a heat sensor* [title changed from Multisensor detectors by ISO 7240-15:2004/Cor.1:2005]

— *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*

The following part is under preparation:

— *Part 8: Carbon monoxide fire detectors using an electro-chemical cell in combination with a heat sensor*

Introduction

ISO 7240 (all parts) specifies components of fire detection and alarm systems, requirements for their interconnection and installation and the performance, testing and servicing of parts or of complete systems.

ISO 7240 (all parts) applies to fire detection and alarm systems for buildings. It can be used as a basis for the assessment of systems for other purposes, e.g. mines, ships. It does not preclude the manufacture or use of systems having special characteristics suitable for protection of specific risks against specific hazards.

A fire detection and alarm system is required to function satisfactorily not only in the event of fire, but also during and after exposure to conditions likely to be met in practice such as corrosion, vibration, direct impact, indirect shock and electromagnetic interference. Some tests specified are intended to assess the performance of system components under such conditions.

The performance of components of fire detection and alarm systems is assessed from the results obtained in the specific tests; ISO 7240 (all parts) is not intended to place any other restrictions on the design and construction of such components.

If appropriate, ISO 7240 (all parts) can be applied to the detection part of extinguishing systems, excluding sprinkler heads, although the sensitivity requirements might not be applicable in every instance.

Fire detection and alarm systems —

Part 1: General and definitions

1 Scope

This part of ISO 7240 provides a set of general guidelines and definitions to be used in describing the fire detection and alarm system equipment, tests and requirements in the other parts of ISO 7240.

The components that a fire detection and alarm system can have are shown in Figure 1. Item C of Figure 1 can be replaced by a sound system for emergency purposes, the components of which are shown in Figure 2.

Fire detectors can be self-contained: these are devices containing within one housing all the components, except possibly the energy source, necessary for detection of fire and giving an audible alarm.

NOTE Inter-connected smoke alarms complying with ISO 12239 and not connected to control and indicating equipment do not form a fire detection and alarm system as defined in this part of ISO 7240.

2 General guidelines

2.1 The purpose of a fire detection and alarm system is to detect fire at the earliest practicable moment and to give an alarm so that the appropriate action can be taken (e.g. evacuation of occupants, summoning the firefighting service, triggering of extinguishing equipment, control of smoke doors, dampers and fans).

A fire alarm system may be activated by automatic detection devices or by manual operation.

2.2 The general principles given in 2.3 to 2.7 are guidelines to the design and construction of fire detection and alarm systems.

2.3 A fire detection and alarm system should

— detect quickly enough to fulfil its intended function;

— reliably transmit the detection signal to the control and indicating equipment and, if applicable, the fire alarm receiving station;

— translate this detection signal into a clear alarm signal that attracts the attention of the occupant in an immediate and unmistakable way;

— remain insensitive to phenomena other than those which its function is to detect;

— signal immediately and clearly any supervised fault that might jeopardize the correct performance of the system.

2.4 A fire detection and alarm system should not

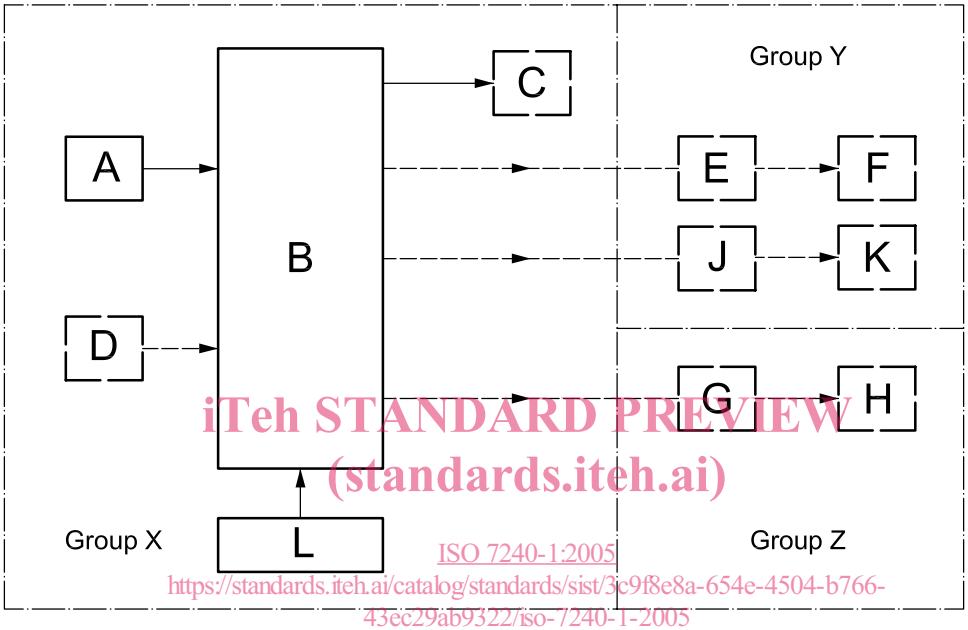
— be adversely affected by any other systems whether associated with it or not;

— be rendered partially or totally inoperative by the fire or the phenomenon which it is designed to detect before the fire or phenomenon has been detected.

2.5 A fire detection and alarm system should be reliable. A system is reliable when it fulfils its intended functions without errors or omissions.

2.6 Compliance of components with ISO 7240 (all parts) does not necessarily ensure the compatibility of components with each other. Compatibility should be considered when designing a system. Requirements for the assessment of the compatibility of system components are specified in ISO 7240-13. Satisfactory operation of an installed system should be confirmed by testing after completion of the installation.

2.7 Any fault affecting a part of a fire detection and alarm system should not result in further faults in the system as a whole or indirect hazards outside the system.



Key

A fire detector
B control and indicating equipment
C fire alarm signalling device
D manual call point
E fire alarm routing equipment
F fire alarm receiving station
G control for automatic fire protection equipment
H automatic fire protection equipment
J fault warning routing equipment
K fault warning receiving station
L power supply

NOTE Transmission and reception of fire alarm fault signals from protected premises may be provided over a common communication channel (i.e. items E and J, and F and K, may be combined).

The significance of the outlines is as follow:

———— equipment and connection elements that are always present in an automatic fire detection and alarm system

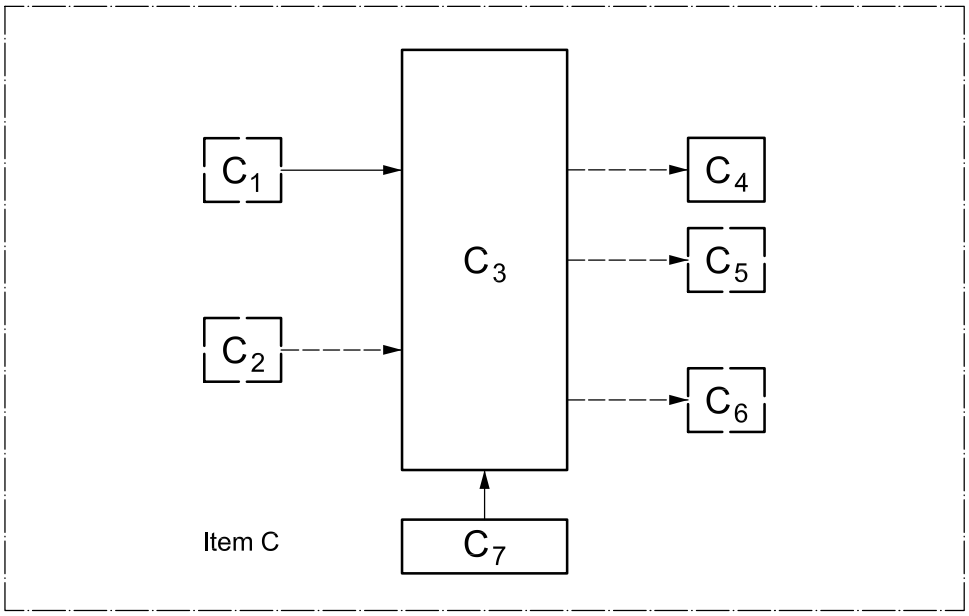
– – – – – – – – equipment and connection elements that may sometimes be present in an automatic fire detection and alarm system

Group X: Equipment required for local warning.

Group Y: Additional equipment required for external aid.

Group Z: Additional equipment required for local automatic fire protection equipment.

Figure 1 — Fire detection and alarm system



Key

C_1 emergency detection system (e.g. fire detection system)
C_2 manual call point
C_3 sound system control and indicating equipment
C_4 loudspeaker
C_5 visual warning device
C_6 tactile warning device
C_7 power supply equipment (may be same as item L in Figure 1)

The significance of the outlines is as follows:

———— equipment and connection elements that are always be present in a sound system for emergency purposes

– – – – – – – – equipment and connection elements that may sometimes be present in a sound system for emergency purposes

Figure 2 — Sound system for emergency purposes

3 Terms and definitions

For the purposes of this part of ISO 7240, the following terms and definitions apply.

3.1
absorbance index
cf. m (3.57)

3.2
access level
one of several states of a control and indicating equipment (see Figure 1, item B and Figure 2, item C_3) in which selected

— controls can be operated,

— manual operations can be carried out,

— indications are visible, and/or,

— information can be obtained.

3.3
addressable point
point that can be individually identified at the control and indicating equipment (see Figure 1, item B)

NOTE Compare **point** (3.73).

3.4
aerosol density
smoke density
amount of particulates per volume as described operationally by one of two parameters:

— m (3.57), an absorbance index, used in the testing of smoke alarms using scattered or transmitted light;

— y (3.110), a dimensionless variable, used in the testing of smoke alarms using ionization.

NOTE Note that these parameters are not concentrations sensu stricto, but represent values which are proportional to the concentration and have been shown to function in lieu of a true concentration value for the purposes of tests.

3.5
alarm
signal, or condition, warning of an emergency

3.6
alarm indication
indication (at the indicating equipment, see Figure 1, item B) to show that a detection signal has been received

3.7
alert signal
audible signal complying with ISO 7731 or visual signal or a combination of audible and visual signals that call attention to the possibility of a hazardous or dangerous situation

3.8
alphanumeric display
indicator capable of giving information by the display of messages consisting of text and/or numeric characters

3.9
analogue detector
detector which gives an output signal representing the value of a the sensed phenomenon

NOTE This may be a true analogue signal or a digitally encoded equivalent of the sensed value. This detector does not itself make a decision of fire alarm.

3.10
automatic fire detection and alarm system
system in which an alarm of fire can be initiated automatically

3.11
automatic fire protection equipment
fire control or firefighting equipment e.g. control of smoke doors, dampers, fans or an automatic extinguishing installation

See Figure 1, item H.

3.12
certification
written confirmation that a certain work or service has been carried out, the result of which is a signed document (certificate) that may be counter-signed and can be used as testimony

3.13
combination detector
detector combining two or more detecting principles in a single housing

3.14
configuration
arrangement of components of a fire detection and alarm system specified by number, type and topology, together with any necessary limits on the connecting links

3.15
confirmation signal
signal from a fire detector or manual call point which terminates a first alarm state

3.16
connection elements
those elements which form the links between the components of a fire detection and alarm system (Figure 1)

3.17
control and indicating equipment
equipment through which detectors can be supplied with power and which

a) is used to accept a detection signal and to activate a fire alarm signal and which may also be required to indicate the location of the fire and to record any of this information;

b) if required, is able to pass on the fire detection signal through fire alarm routing equipment (see Figure 1, item E) to, for example, the fire fighting service or, through the control for automatic fire protection equipment (see Figure 1, item G), to, for example an automatic extinguishing installation;

c) is used to automatically supervise the correct function of the system and give audible and visible warning of specified faults.

See Figure 1, item B.

3.18
control for automatic fire protection equipment
automatic device used to actuate automatic fire protection equipment (see Figure 1, item H) after receiving a signal from the control and indicating equipment

See Figure 1, item G.

3.19
documentation
drawings and instructions necessary to understand and to operate the fire detection and alarm system

3.20
detachable detector
detector designed to be easily removed from its normal operating position for maintenance and servicing process

3.21
detection circuit
transmission path which connects points to the control and indicating equipment (see Figure 1, item B)

NOTE Compare **point** (3.73) and **transmission path** (3.103).