

# Fire detection and fire alarm systems —

## Part 2: Control and indicating equipment

ICS 13.220.20

## National foreword

This British Standard is the UK implementation of EN 54-2:1997+A1:2006. Together with BS EN 54-4:1997, it supersedes BS 5839-4:1988 which is withdrawn. It is one of a series of standards for fire detection and fire alarm systems (see BS EN 54-1 for a full list of current and proposed standards).

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by A1 A1.

The UK participation in its preparation was entrusted by Technical Committee FSH/12, Fire detection and alarm systems, to Subcommittee FSH/12/3, Control and indicating equipment.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Board and comes into effect on 15 March 1998

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### Amendments/corrigenda issued since publication

Amd. No.	Date	Comments
16781	30 November 2006	Implementation of CEN amendment A1:2006
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	31 July 2009	Correction to <b>7.4.2</b> and the title of <b>8.9</b> and alignment of BSI and CEN publication dates.

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Descriptors: Fire equipment, fire detection systems, automatic equipment, safety devices, signal devices, inspection devices, specifications, tests, classification, marking

English version

## Fire detection and fire alarm systems — Part 2: Control and indicating equipment

Systèmes de détection et d'alarme incendie —      Brandmeldeanlagen —  
Partie 2: Equipement de contrôle et de signalisation      Teil 2: Brandmelderzentralen

This European Standard was approved by CEN on 25 December 1996.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CEN**

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

**Central Secretariat: rue de Stassart 36, B-1050 Brussels**

## **Foreword**

This European Standard has been prepared by the technical Committee CEN/TC 72, Fire detection and fire alarm systems, the secretariat of which is held by BSI.

This standard has been prepared in co-operation with the CEA (Comité Européen des Assurances) and with EURALARM (Association of European Manufacturers of Fire and Intruder Alarm Systems).

EN 54 is published in a series of parts. Information on the relationship between this European Standard and other standards of the EN 54 series is given in annex A of EN 54-1.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1998, and conflicting national standards shall be withdrawn at the latest by December 2007. In addition, a further 36 months shall be allowed for certification purposes for equipment conforming to the national standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## **Foreword to amendment A1**

This document (EN 54-2:1997/A1:2006) has been prepared by Technical Committee CEN/TC 72 “Fire detection and fire alarm systems”, the secretariat of which is held by BSI.

This Amendment to the European Standard EN 54-2:1997 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2007, and conflicting national standards shall be withdrawn at the latest by December 2007.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

Amendment 1 to this standard improves the additional requirements for software controlled equipment and makes a number of miscellaneous changes, to correct errors and better reflect the current state of the art. It also replaces the descriptions of the individual electromagnetic compatibility immunity tests with a reference to the EMC Product Family Standard EN 50130-4, makes editorial and technical changes to generally improve clarity, and updates the normative references.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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## Introduction

This Part of the European Standard EN 54 is drafted on the basis of mandatory functions which are to be provided on all control and indicating equipment, and optional functions (with requirements) which may be provided. It is intended that the options be used for specific applications, as recommended in application guidelines.

Each optional function is included as a separate entity, with its own set of associated requirements, in order to permit control and indicating equipment with many different combinations of functions to comply with this European Standard.

Other functions associated with fire detection and fire alarm may also be provided, even if not specified in this European Standard.

## 1 Scope

This European Standard specifies requirements, methods of test, and performance criteria for control and indicating equipment (see item B of figure 1 of EN 54-1) for use in fire detection and fire alarm systems installed in buildings.

## 2 Normative references

**A1** 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.

EN 54-1:1996	<i>Fire detection and fire alarm systems — Part 1: Introduction</i>
EN 54-4:1997	<i>Fire detection and fire alarm systems — Part 4: Power supply equipment</i>
EN 54-7:2000	<i>Fire detection and fire alarm systems — Part 7: Smoke detectors — Point detectors using scattered light, transmitted light or ionization</i>
EN 50130-4:1995	<i>Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder and social alarm systems</i>
EN 60068-1:1994	<i>Environmental testing — Part 1: General and guidance (IEC 60068-1:1988 + Corrigendum 1988 + A1:1992) <b>A1</b></i>

<b>A1</b> EN 60068-2-1:1993	<i>Environmental testing; part 2: tests; tests A: cold (IEC 60068-2-1:1990)</i>
EN 60068-2-6:1995	<i>Environmental testing — Part 2: Tests — Tests Fc: Vibration (sinusoidal) (IEC 60068-2-6:1995 + Corrigendum 1995)</i>
EN 60068-2-47:2005	<i>Environmental testing — Part 2-47: Test Mounting of specimens for vibration, impact and similar dynamic tests (IEC 60068-2-47:2005)</i>
EN 60068-2-75:1997	<i>Environmental testing — Part 2: Tests — Test Fc: Hammer tests (IEC 60068-2-75:1997)</i>
EN 60068-2-78:2001	<i>Environmental testing — Part 2-78: Tests, Test Cab: Damp heat, steady state (IEC 60068-2-78:2001)</i>
EN 60529:1991	<i>Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)</i>
EN 60721-3-3:1995	<i>Classification of environmental conditions — Part 3: Classification of groups of environmental parameters and their severities — Section 3: Stationary use at weatherprotected locations (IEC 60721-3-3:1994) <b>A1</b></i>

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of this standard, the definitions given in EN 54-1 apply together with the following:

#### 3.1.1

**A1** Deleted (numbering kept)

#### 3.1.2

**addressable point**

point that can be individually identified at the CIE

#### 3.1.3

**alphanumeric display**

indicator that is capable of giving information by the display of messages consisting of text and/or numeric characters **A1**

**A1** 3.1.4**functional condition**

state of the CIE characterised by mandatory indication(s)

NOTE The functional conditions recognized in this European Standard are the following:

- fire alarm condition, when a fire alarm is indicated,
- fault warning condition, when a fault is indicated,
- disabled condition, when the disablement of functions is indicated,
- test condition, when the testing of functions is indicated,
- quiescent condition, when the CIE is powered by a power supply conforming to EN 54-4 and no other functional condition is indicated.

## 3.1.5

**detection circuit**

transmission path that connects points to the CIE

## 3.1.6

**earth fault**

unwanted connection between earth potential and any part of the CIE, transmission paths to the CIE, or transmission paths between parts of the CIE

## 3.1.7

**field**

sub-division of a window

## 3.1.8

**indicator**

device which can change its state to give information

## 3.1.9

**Deleted (numbering kept)**

## 3.1.10

**Deleted (numbering kept)**

## 3.1.11

**non-volatile memory**

memory elements that do not require the presence of an energy source for the retention of their contents **A1**

**A1** 3.1.12**point**

component connected to a detection circuit that is able to transmit or receive information in relation to fire detection

EXAMPLE Items A or D of Figure 1 of EN 54-1:1996

## 3.1.13

**program**

software necessary for a CIE to comply with at least the requirements of this European Standard, including initialising data, reset and interrupt vectors, operating code, and declarations

## 3.1.14

**Deleted (numbering kept)**

## 3.1.15

**running data**

alterable data subject to temporary modification during operation, either automatically or by manual controls

## 3.1.16

**separate**

physically separate, and exclusively provided for the purpose or purposes stated in this European Standard

## 3.1.17

**silencing**

switching off the audible signal of a sounding device that is capable of being re-sounded by a new event

## 3.1.18

**site specific data**

alterable data required for the CIE to operate in a defined system configuration

## 3.1.19

**transmission path**

physical connection, external to the cabinet of the CIE, for the transmission of information and/or power between the CIE and other components of a fire detection and fire alarm system (as defined in EN 54-1:1996), and/or between parts of a CIE contained in different cabinets

## 3.1.20

**volatile memory**

memory elements that require the presence of an energy source for the retention of their contents **A1**



**A1** 3.1.21**window**

area of the alphanumeric display used for information relating to one functional condition at a given time

NOTE A window may be realized either by mechanical separation or under software control.

## 3.1.22

**zone**

geographical sub-division of the protected premises in which one or more points are installed and for which a common zonal indication is provided

## 3.1.23

**module**

part of the program that fulfils specified functions

## 3.1.24

**first alarm signal**

signal from a fire detector which is interpreted as a fire alarm, but following which the CIE enters a first alarm state

## 3.1.25

**first alarm state**

state of the CIE following the receipt of a first alarm signal during which mandatory functions of the CIE may be inhibited

## 3.1.26

**confirmation alarm signal**

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

## 3.1.27

**integrated PSE**

PSE within other equipment where it is not possible for the manufacturer to specify the output voltage range(s) of the PSE and the input voltage range(s) of that equipment and where its repair involves replacement of a part or the whole of the other equipment **A1**

**3.2 Abbreviations**

For the purposes of this European Standard the following abbreviations apply:

CIE: control and indicating equipment.

**A1** PSE: power supply equipment **A1**

**4 General requirements**

If an optional function with requirements is included in the CIE, then all the corresponding requirements shall be met (see also annex B).

If functions other than those specified in this European Standard are provided they shall not jeopardize compliance with any requirements of this European Standard.

**5 General requirements for indications****5.1 Display of functional conditions**

**5.1.1** The CIE shall be capable of unambiguously indicating the following functional conditions, as described in clauses 6 to 10.

- Quiescent condition.
- Fire alarm condition.
- Fault warning condition.
- Disablement condition.

**A1** – Test condition (if provided). **A1**

**5.1.2** The CIE shall be capable of being simultaneously in any combination of the following functional conditions.

- Fire alarm condition.
- Fault warning condition.
- Disablement condition.

**A1** – Test condition (if provided). **A1**

**5.2 Display of indications**

All mandatory indications shall be clearly identifiable, except where otherwise specified in this European Standard.

**5.3 Indications on alphanumeric displays**

Where an alphanumeric display is used to display indications relating to different functional conditions these may be displayed at the same time. However, for each functional condition there shall be only one window, in which all of the fields relating to that functional condition are grouped.

**5.4 Indication of the supply of power**

A visible indication shall be given by means of a separate light emitting indicator while the CIE is supplied with power.

**5.5 Audible indications**

The audible indication for the fire alarm condition may be the same as that for the fault warning condition. If they are different, the fire alarm indication shall have priority.

### 5.6 Additional indications

Where indications are used in addition to mandatory indications these shall not result in contradiction or confusion.

## 6 The quiescent condition

Any kind of system information may be displayed during the quiescent condition. However, no indications shall be given which could be confused with indications used in the:

- fire alarm condition;
- fault warning condition;
- disabled condition;
- test condition.

## 7 The fire alarm condition

### 7.1 Reception and processing of fire signals (see also annex C)

**7.1.1** The CIE shall enter the fire alarm condition when signals are received which after any necessary processing are interpreted as a fire alarm.

**7.1.2** The CIE shall be capable of receiving, processing and indicating signals from all zones. A signal from one zone shall not falsify the processing, storing and/or indication of signals from other zones.

**7.1.3** Unless **7.1.2** applies, the time taken by scanning, interrogation, or other processing of signals from fire detectors, in addition to that required to take the fire alarm decision, shall not delay the indication of the fire alarm condition, or of a new zone in alarm by more than 10 s.

**7.1.4** The CIE shall enter the fire alarm condition within 10 s of the activation of any manual call point.

**A1** **7.1.5** The mandatory indications and outputs shall not be falsified by multiple fire signals received from the same or different detection circuits, resulting from the simultaneous operation of two points and/or the operation of further points. **A1**

### 7.2 Indication of the fire alarm condition

The fire alarm condition shall be indicated without prior manual intervention. The indication is established when all of the following are present.

- a) A visible indication, by means of a separate light emitting indicator (the general fire alarm indicator).
- b) A visible indication, as specified in **7.3**, of the zones in alarm, which may be omitted for CIEs capable of receiving signals from only one zone.
- c) An audible indication, as specified in **7.4**.

### 7.3 Indication of the zones in alarm (see also annex D)

**7.3.1** The zones in alarm shall be visibly indicated by means of a separate light emitting indicator for each zone and/or an alphanumeric display.

**7.3.2** If the zonal indications are on an alphanumeric display, which because of its limited capacity cannot simultaneously indicate all the zones in alarm, at least the following shall apply.

- a) The first zone in alarm shall be displayed in a field at the top of the display.
- b) The most recent zone in alarm shall be permanently displayed in another field.
- A1** c) The total number of zones in alarm shall be displayed.
- d) Zones in alarm, but not currently indicated, shall be capable of being displayed at access level 1. A single manual action shall be required for the display of each zone in alarm. Either individual fields, or the the whole alarm window, may be temporarily suppressed to permit the display of additional zones in alarm. However, the display shall meet the requirements of 7.3.2 a), 7.3.2 b) and 7.3.2 c) within 30 s following the last interrogation. **A1**

### 7.4 Audible indication

**7.4.1** The audible indication shall be capable of being silenced by means of a separate manual control at access level 1 or 2. This control shall only be used for silencing the audible indication, and may be the same as that used for silencing in the fault warning condition. **A1** The silencing of the audible indication may be accompanied by changes in the visible indications of fire or fault, provided that the conditions are still indicated as required in this standard (e.g. the indication of light emitting indicators may change from flashing to steady, or the information given on an alphanumeric display may be updated). **A1**

**7.4.2** The audible indication shall not be silenced automatically.

**A1** **7.4.3** The audible indication shall re-sound for each new zone in alarm.

### 7.5 Other indications during the fire alarm condition

**7.5.1** If faults, disablements or tests are indicated by means of one or more light emitting indicators, and such indications are suppressed in the fire alarm condition, it shall be possible to reveal these by means of a manual operation at access level 1 or 2. **A1**

**A1) 7.5.2** If the fire alarm indications are on an alphanumeric display, the following shall apply to the display of other information on the alphanumeric display:

- a) information not related to the fire alarm condition shall be suppressed, unless the display has more than one window, one of which is exclusively reserved for fire alarm indications,
- b) suppressed indications of faults, disablements and tests shall be capable of being displayed, at any time, by manual operations at access level 1 or 2, which are different from, or additional to that specified in 7.3.2 d) to display zones in fire alarm, and which are capable of displaying faults, disablements and tests independently,
- c) either individual fields, or the whole fire alarm window, may be temporarily suppressed to permit the display of faults, disablements and tests. However, the display shall meet the requirements of 7.3.2 a), 7.3.2 b) and 7.3.2 c) within 30 s following the last interrogation. **A1**

## 7.6 Reset from the fire alarm condition

**A1) 7.6.1** The CIE shall be capable of being reset from the fire alarm condition. This shall only be possible by means of a separate manual control, at access level 2. This control shall be used only for reset and may be the same as that used for reset from the fault warning condition. **A1**

**7.6.2** Following a reset operation, the indication of the correct functional conditions, corresponding to any received signals, shall either remain, or be re-established within 20 s.

## 7.7 Output of the fire alarm condition

**7.7.1** At least one output which signals the fire alarm condition shall be provided, which may be an output as specified in 7.8, 7.9, or 7.10.

**A1) 7.7.2** Unless 7.11 and/or 7.12 apply, the CIE shall activate all mandatory outputs within 3 s of the indication of a fire alarm condition.

**7.7.3** Unless 7.11 applies, the CIE shall activate all mandatory outputs within 10 s of the activation of any manual call point. **A1**

## **A1) 7.8 Output to fire alarm devices (option with requirements — see also 8.2.5 a) and 9.4.2 a))**

The CIE may have provision for the automatic transmission of fire alarm signals to fire alarm devices (item C of Figure 1 of EN 54-1:1996). In this case the following shall apply.

- a) It shall be possible to silence the fire alarm devices at access level 2.
- b) Following silencing, it shall be possible to re-sound the fire alarm devices at access level 2.
- c) The fire alarm devices shall not be silenced automatically.
- d) It shall be possible to configure the CIE at access level 3 to automatically re-sound the fire alarm devices following an alarm in another zone.

## 7.9 Control of fire alarm routing equipment (options with requirements)

### 7.9.1 Output to fire alarm routing equipment (option with requirements — see also 8.2.5 b) and 9.4.2 b))

The CIE may have provision for the automatic transmission of fire alarm signals to fire alarm routing equipment (item E of Figure 1 of EN 54-1:1996). In this case the transmission of the signal shall be indicated by means of a separate light emitting indicator and/or an alphanumeric display. The indication shall remain until the fire alarm condition is reset.

### 7.9.2 Alarm confirmation input from fire alarm routing equipment (option with requirements)

If 7.9.1 applies, the CIE may have an input which is capable of receiving signals from fire alarm routing equipment (item E of Figure 1 of EN 54-1:1996). In this case the reception of the signals shall be indicated by means of a separate light emitting indicator and/or an alphanumeric display. The light emitting indicator may replace the indicator of 7.9.1. The indication shall remain until the fire alarm condition is reset.

## 7.10 Outputs to fire protection equipment (options with requirements)

### 7.10.1 Output type A (option with requirement — see also 8.2.4 f) and 9.4.1 b))

The CIE may have provision for the transmission of fire alarm signals to controls for automatic fire protection equipment (item G of Figure 1 of EN 54-1:1996). **A1**

**Ⓐ) 7.10.2 Output type B (option with requirement — see also 8.2.4 f) and 9.4.1 b))**

The CIE may have provision for the transmission of fire alarm signals to controls for automatic fire protection equipment (item G of Figure 1 of EN 54-1:1996). In this case the transmission of the signal shall be indicated by means of a separate light emitting indicator and/or an alphanumeric display. The indication shall be at least common to all items G, and shall not be suppressed during the fire alarm condition.

**7.10.3 Output type C (option with requirement — see also 8.2.4 f) and 9.4.1 b))**

The CIE may have provision for the transmission of fire alarm signals to controls for automatic fire protection equipment (item G of Figure 1 of EN 54-1:1996). In this case the reception of a confirmatory signal from G shall be indicated by means of a separate light emitting indicator and/or an alphanumeric display. The indication shall be at least common to all items G, and shall not be suppressed during the fire alarm condition.

**7.10.4 Fault monitoring of fire protection equipment (option with requirement — see also 8.2.4 f))**

The CIE may have provision to receive fault warning signals from controls for automatic fire protection equipment (item G of Figure 1 of EN 54-1:1996). These faults shall be indicated by means of a separate light emitting indicator and/or an alphanumeric display. The indication shall be at least common to all items G, and shall not be suppressed during the fire alarm condition. The indicator may be the same as that of 8.2.4 f).

**7.11 Delays to outputs (option with requirements; see also Annex E)**

**7.11.1** The CIE may have provision to delay the activation of outputs to fire alarm devices (item C of Figure 1 of EN 54-1:1996) and/or to fire alarm routing equipment (item E of Figure 1 of EN 54-1:1996) and/or to controls for automatic fire protection equipment (item G of Figure 1 of EN 54-1:1996). In these cases at least the following shall apply:

- a) the operation of delays to outputs to C and G shall be configurable at access level 3 to apply to:
  - fire detectors, and/or,
  - manual call points, and/or,
  - individual zones;
- b) the operation of delays to outputs to E shall be configurable at access level 3, to apply to:
  - fire detectors, and/or,
  - individual zones; Ⓐ)

Ⓐ) c) the delay times shall be configurable at access level 3, in increments not exceeding 1 min, up to a maximum of 10 min;

d) it shall be possible to override the delays and immediately activate delayed outputs by means of a manual operation at access level 1 and/or by means of a signal from a manual call point;

e) the delay to one output signal shall not affect the activation of other outputs.

**7.11.2** If 7.11.1 applies, the CIE may have provision to switch on and switch off the delayed operation of outputs. In this case the following shall apply:

a) it shall be possible to switch on and switch off delays, by means of a manual operation at access level 2,

b) there may be provision to automatically switch on and/or switch off delays by means of a programmable timer, which shall be configurable at access level 3,

c) the mode of operation when delays are switched on shall be visibly indicated by means of a separate light emitting indicator and/or an alphanumeric display. The indication shall not be suppressed during the fire alarm condition.

**7.12 Dependencies on more than one alarm signal (options with requirement)**

**7.12.1 Type A dependency (option with requirement)**

Following the receipt of a first alarm signal from a fire detector, the entry to the fire alarm condition may be inhibited until the receipt of a confirmation alarm signal from the same fire detector, or from a fire detector in the same zone. In this case, the first alarm state need not be indicated, and the following shall apply:

a) the mode of operation shall be configurable at access level 3 for individual zones;

b) reception of a confirmation alarm signal shall not be inhibited for more than 60 s following the receipt of the first alarm signal. The manufacturer may specify a time shorter than 60 s. In this case, this specification shall be tested and verified;

c) the first alarm state shall be automatically cancelled within 30 min of the receipt of the first alarm signal;

d) information on the values of the configured delay times shall be accessible at access level 2 or 3. Ⓐ)

**7.12.2 Type B dependency (option with requirement)**

Following the receipt of a first alarm signal from a fire detector, the entry to the fire alarm condition may be inhibited until the receipt of a confirmation alarm signal from the same fire detector and/or from another fire detector, which may be in the same or a different zone. In this case the following shall apply:

- a) the mode of operation shall be configurable at access level 3 for at least individual zones;
- b) the first alarm state shall be indicated by means of:
  - an audible indication as in 12.10 which may be the same as that in the fire alarm condition or fault warning condition;
  - a visible indication of the affected zone, which may be the same as that for indication of zone in alarm as in 7.3. The General Fire Alarm Indicator shall not be illuminated;
- c) it shall be possible to manually cancel the first alarm state at access level 2. This may be done with the same control as is used for reset from the fire alarm condition or fault warning condition;
- d) the CIE may have provision to automatically cancel the first alarm state after a time interval which shall not be less than 5 min;
- e) if the mode of operation is configured to accept a confirmation alarm signal from the same fire detector, this shall not be inhibited for more than 4 min following the receipt of the first alarm signal.

**7.12.3 Type C dependency (option with requirement)**

Following the receipt of a fire alarm signal from a fire detector or a manual call point, the CIE shall enter the fire alarm condition, but may have provision to inhibit the activation of outputs until a second alarm signal is received from another fire detector or manual call point, which may be in the same or another zone. In this case it shall be possible to configure the mode of operation at access level 3 to apply individually to each of the following (where provided):

- output to fire alarm devices (item C of Figure 1 of EN 54-1:1996), as in 7.8,
- output to fire alarm routing equipment (item E of Figure 1 of EN 54-1:1996), as in 7.9,
- output to fire protection equipment (item G of Figure 1 of EN 54-1:1996), as in 7.10. **A1**

**7.13 Alarm counter (option with requirements)**

The CIE may have provision to record the number of instances that the CIE enters the fire alarm condition. In this case at least the following shall apply.

- A1** a) re-initialisation of the counter shall be possible at access level 4. In the event of the CIE being de-energised the data shall be retained for at least 14 days. **A1**
- b) The information shall be available at access level 1 or 2.
- c) The counter shall be capable of recording at least 999 instances.

**8 Fault warning condition (see also annex F)****8.1 Reception and processing of fault signals**

**8.1.1** The CIE shall enter the fault warning condition when signals are received which, after any necessary processing, are interpreted as a fault.

**A1 8.1.2** The CIE shall be capable of simultaneously recognising all of the faults specified in 8.2 and (if provided) in 8.3, with the exception that the recognition of a fault in a given zone or function may be prevented by one or more of the following:

- a) the presence of fire alarm signals from the same zone,
- b) the disablement of the corresponding zone or function,
- c) the testing of the corresponding zone or function,
- d) the activation of the output to a transmission path which is exclusively used to transmit signals to:
  - fire alarm devices (item C of Figure 1 of EN 54-1:1996) or,
  - fire alarm routing equipment (item E of Figure 1 of EN 54-1:1996) or,
  - controls for automatic fire protection equipment (item G of Figure 1 of EN 54-1:1996) or,
  - fault warning routing equipment (item J of Figure 1 of EN 54-1:1996). **A1**

**8.1.3** The CIE shall enter the fault warning condition within 100 s of the occurrence of the fault or the reception of a fault signal, or within another time as specified in this European Standard or in other parts of EN 54.

**A1 8.2 Indication of faults**

**8.2.1** The presence of a fault, as specified in 8.2.4, 8.2.5, 8.2.6 and, if provided, 8.3 shall be indicated without prior manual intervention. The fault warning condition is established when the following are present: **A1**

- a) A visible indication by means of a separate light emitting indicator (the general fault warning indicator).

- A1**) b) a visible indication for each recognised fault; **A1**  
c) An audible indication, as specified in 8.6.

**A1** 8.2.2 If the indication of 8.2.1 b) is by means of separate light emitting indicators, these may be the same as those used to indicate disablement and/or testing of the corresponding zones or functions, provided that the fault indication is distinguishable from the disablement and test indications (see also 10.3 and 12.7.3). **A1**

**8.2.3** If the indication is on an alphanumeric display, which cannot simultaneously indicate all of the faults because of its limited capacity, at least the following shall apply.

- The presence of fault indications which have been suppressed shall be indicated.
- Suppressed fault indications shall be capable of being displayed by means of a manual operation at access level 1 or 2 which interrogates only fault indications.

**8.2.4** The following faults shall be indicated by means of separate light emitting indicators and/or an alphanumeric display. The indications may be suppressed during the fire alarm condition.

- An indication for each zone in which the transmission of signals from a point to the CIE is affected by:

- A1**— a short circuit in a detection circuit;  
— an interruption in a detection circuit;  
— the removal of a point; **A1**

- An indication at least common to any power supply fault resulting from:
  - a short circuit or an interruption in a transmission path to a power supply (item L of figure 1 of EN 54-1), where the power supply is contained in a different cabinet from that of the CIE;
  - power supply faults as specified in EN 54-4.

- A1**) c) an indication, at least common to any single earth fault which affects a mandatory function, and which is not otherwise indicated as a fault of a supervised function; **A1**

- An indication as a fault of the supervised function of the rupture of any fuse, or the operation of any protective device which is capable of affecting a mandatory function in the fire alarm condition.

- An indication of any short circuit or interruption, at least common to all transmission paths between parts of the CIE contained in more than one mechanical cabinet, which is capable of affecting a mandatory function, and which is not otherwise indicated as a fault of a supervised function.

- A1**) f) an indication of any short circuit or interruption, at least common to all transmission paths, which affects the transmission of signals to or reception of signals from controls for automatic fire protection equipment (item G of Figure 1 of EN 54-1:1996). **A1**

- An indication of any short circuit or interruption, at least common to all transmission paths, which affects the transmission of signals to fault warning routing equipment (item J of figure 1 of EN 54-1).

**8.2.5** The following faults shall be indicated by means of separate light emitting indicators and/or an alphanumeric display. The indications shall not be suppressed during the fire alarm condition.

- An indication of any short circuit or interruption, at least common to all transmission paths, which affects the transmission of signals to fire alarm devices (item C of figure 1 of EN 54-1).
- An indication of any short circuit or interruption, at least common to all transmission paths, which affects the transmission of signals to fire alarm routing equipment (item E of figure 1 of EN 54-1).

**8.2.6** The following faults shall be indicated at least by means of the general fault warning indicator.

- Any short circuit or interruption in a transmission path between parts of the CIE contained in more than one mechanical cabinet, where the fault does not affect a mandatory function.
- Any short circuit or interruption in a detection circuit, where the fault does not prevent the transmission of signals to the CIE.

### 8.3 Fault signals from points (option with requirements)

The CIE may have provision for the reception, processing and indication of fault signals from points. In this case faults shall be indicated at least as zone faults, as specified in 8.2.4a.

### **A1** 8.4 Total loss of the power supply (option with requirements)

In the event of the loss of the main power source (as specified in EN 54-4), the CIE may have provision to recognise and indicate the failure of the standby power source to a point where it may no longer be possible to fulfil mandatory functions of this European Standard. In this case at least an audible indication, as in 12.10, shall be given for a period of at least one hour. **A1**

### 8.5 System fault

A system fault is a fault as specified in 13.4 or 13.6 in the case of a software controlled CIE. A system fault may prevent requirements of this European Standard, other than those specified in 8.5 and 13.7, from being fulfilled. In the event of a system fault at least the following shall apply.

- A1**) a) a system fault shall be visibly indicated by means of the General Fault Warning Indicator and a separate light emitting indicator. These indications shall not be suppressed by any other functional condition of the CIE and shall remain until a manual reset and/or another manual operation at access level 2 or 3; **A1**
- b) A system fault shall be audibly indicated. This indication may be capable of being silenced.



## 8.6 Audible indication

**8.6.1** The audible indication of faults under **8.2** and, if provided, **8.3**, shall be capable of being silenced manually at access level 1 or 2. The same manual operation may be used as that for silencing the audible indication in the fire alarm condition.

**8.6.2** The audible indication shall be silenced automatically if the CIE is automatically reset from the fault warning condition.

**8.6.3** If previously silenced, the audible indication shall re-sound for each newly recognised fault.

## 8.7 Reset of fault indications

**8.7.1** Indications of faults as under **8.2** and, if provided, **8.3**, shall be capable of being reset. **A1**

- automatically when faults are no longer recognized; and/or
- by a manual operation at access level 2, which may be the same as that used for resetting from the fire alarm condition.

**8.7.2** Following reset, the indication of the correct functional conditions, corresponding to any received signals, shall either remain or be re-established within 20 s.

## **A1** 8.8 Fault output

The CIE shall have an output which signals the fault warning condition. This may be the output specified in **8.9**. The output signal shall be given if the CIE is de-energised.

## 8.9 Output to fault warning routing equipment (option with requirements — see also **8.2.4.g** and **9.4.1.c**)

The CIE may have provision for the transmission of fault signals to fault warning routing equipment (item J of Figure 1 of EN 54-1:1996). This output shall signal the fault warning condition. The output signal shall also be given if the CIE is de-energised. **A1**

## 9 Disabled condition

### 9.1 General requirements

**9.1.1** Disablements as under **9.4** and **9.5** shall inhibit all corresponding mandatory indications and/or outputs, but shall not prevent other mandatory indications and/or outputs.

**9.1.2** The CIE shall have provision to independently disable and re-enable each of the functions specified in **9.4**, by means of manual operations at access level 2.

**9.1.3** The CIE shall be in the disabled condition while a disablement as under **9.4** and/or **9.5** exists.

**9.1.4** Disablement and re-enablement shall not be affected by a reset from the fire alarm condition, or from the fault warning condition.

### 9.2 Indication of the disabled condition

The disabled condition shall be indicated visibly, by means of the following.

- a) A separate light emitting indicator (the general disablement indicator).
- b) An indication for each disablement, as specified in **9.3**, **9.4** and **9.5**.

### 9.3 Indication of specific disablements

**A1** **9.3.1** Disablements shall either be indicated within 2 s of the completion of the manual operation, or where a disablement cannot be completed within 2 s, it shall be indicated within 2 s that the disabling process is running.

**9.3.2** The same light emitting indicator may be used as that for the indication of the corresponding fault (see **8.2.1 b**), although the indication shall be distinguishable (see also **12.7.3**). The same light emitting indicator and the same indication may be used to indicate a disabled zone and a zone under test. **A1**

**9.3.3** If the indication is on an alphanumeric display, which cannot simultaneously indicate all of the disablements because of its limited capacity, at least the following shall apply.

- a) The presence of disablement indications which have been suppressed shall be indicated.

**A1** b) suppressed disablement indications shall be capable of being displayed by means of a manual operation at access level 1 or 2 which interrogates only disablement indications. **A1**

### 9.4 Disablements and their indication

**9.4.1** The following shall be capable of being independently disabled and re-enabled.

- a) Each zone.
- A1** b) output signals and/or transmission paths to controls for automatic fire protection equipment (item G of Figure 1 of EN 54-1:1996); **A1**
- c) Output signals and/or transmission paths to fault warning routing equipment (item J of figure 1 of EN 54-1 **A1**:1996 **A1**).

The disablements shall be indicated by means of separate light emitting indicators and/or an alphanumeric display. The indications may be suppressed during the fire alarm condition.

**A1** The disablement and re-enablement of output signals and/or transmission paths to G shall be by means of a common control and/or individual controls. An indication shall be provided for each output signal and/or transmission path to G that is capable of being disabled. If only a common control is provided the indication shall be given by either a common indication and/or individual indications of disablement. **A1**

**9.4.2** The following shall be capable of being independently disabled and re-enabled.

- a) output signals and/or transmission paths to fire alarm devices (item C of Figure 1 of EN 54-1:1996);
- b) Output signals and/or transmission paths to fire alarm routing equipment (item E of figure 1 of EN 54-1).

The disablements shall be indicated by means of separate light emitting indicators and/or an alphanumeric display. The indications shall not be suppressed during the fire alarm condition.

**[A1]** The disablement and re-enablement of output signals and/or transmission paths to C shall be by means of a common control and/or individual controls. An indication shall be provided for each output signal and/or each transmission path to C that is capable of being individually disabled. If only a common control is provided the indication shall be given by either a common indication and/or individual indications of disablement. **[A1]**

### **9.5 Disablement of addressable points (option with requirements)**

The CIE may have provision for disabling and enabling signals from addressable points by a manual operation at access level 2, either individually, or in groups which do not comprise a complete zone. In this case, at least the following shall apply.

- a) It shall be possible to disable each addressable point individually.
- b) It shall be possible to identify all the disablements by manual interrogation at access level 1 or 2.
- c) The disablement of addressable points shall not be indicated as zone disablements unless all the addressable points in the zones have been disabled.

**[A1]** d) If all addressable points in a zone are disabled this shall be indicated as a zone disablement. **[A1]**

## **10 Test condition (option with requirements)**

### **10.1 General requirements**

The CIE may have provision for testing the processing and indication of fire alarm signals from zones. This may inhibit the requirements during the fire alarm condition which correspond to that zone. In this case, at least the following shall apply.

- a) The CIE shall be in test condition while one or more zones are under test.
- [A1]** b) A test state shall only be entered or cancelled by a manual operation, at access level 2 or 3. **[A1]**
- c) It shall be possible to test the operation of each zone individually.
- d) Zones in the test state shall not prevent the mandatory indications and outputs from zones not in the test state.

e) Signals from a zone under test shall not lead to the operation of the outputs to:

- fire alarm devices (item C of figure 1 of EN 54-1), except temporarily in order to test their functioning in relation to the corresponding zone;
- fire alarm routing equipment (item E of figure 1 of EN 54-1);
- controls for automatic fire protection equipment (item G of figure 1 of EN 54-1);
- fault warning routing equipment (item J of figure 1 of EN 54-1).

### **10.2 Indication of the test condition**

The test condition shall be indicated visibly, by means of the following.

- a) A separate light emitting indicator (the general test indicator).
- b) An indication for each zone, as specified in **10.3**.

### **10.3 Indication of zones in the test state**

**10.3.1** Entry to test states shall either be indicated within 2 s of the completion of the manual operation, or where the entry cannot be completed within 2 s, it shall be indicated within 2 s that the process is running.

**10.3.2** Zones in the test state shall be visibly indicated, by means of a separate light emitting indicator for each zone and/or an alphanumeric display. The same light emitting indicator and the same indication may be used to indicate a zone under test and a disabled zone.

**10.3.3** If the indication is on an alphanumeric display, which cannot simultaneously indicate all of the tests because of its limited capacity, at least the following shall apply:

- a) the presence of test indications which have been suppressed shall be indicated,
- b) suppressed test indications shall be capable of being displayed, by means of a manual operation at access level 1 or 2 which interrogates only test indications.

## **11 Standardized input/output interface (option with requirements — see also annex G)**

The CIE may have provision for a standardized input/output interface, suitable for the transmission and reception of signals to and from ancillary equipment (e.g. a fire brigade panel). In this case at least the following shall apply.

- a) The interface shall be capable of transmitting at least the occurrence of the following.
  - The fire alarm condition.
  - Each zone in alarm.



- The transmission of output signals to fire alarm routing equipment (item E of figure 1 of EN 54-1).
  - The transmission of output signals to fire protection equipment (item G of figure 1 of EN 54-1).
  - The fault warning condition.
  - Each zone fault.
  - The disablement and re-enablement of each zone.
  - The disablement and re-enablement of the output to fire alarm devices (item C of figure 1 of EN 54-1).
  - The disablement and re-enablement of the output to fire alarm routing equipment (item E of figure 1 of EN 54-1).
  - The disablement and re-enablement of output signals to fire protection equipment (item G of Figure 1 of EN 54-1:1996).
- b) The interface shall be capable of receiving at least the following information and of activating the corresponding functions of the CIE
- Silencing of the audible indication.
  - The reset of the fire alarm condition.
  - Silencing and re-sounding of the fire alarm devices (item C of figure 1 of EN 54-1).
  - The disablement and re-enablement of zones.
  - The disablement and re-enablement of output signals to fire alarm devices (item C of figure 1 of EN 54-1).
  - The disablement and re-enablement of output signals to fire alarm routing equipment (item E of figure 1 of EN 54-1).

**[A1]** – The disablement and re-enablement of output signals to fire protection equipment (item G of Figure 1 of EN 54-1:1996). **[A1]**

## 12 Design requirements

### 12.1 General requirements and manufacturer's declarations

The c.i.e. shall comply with the design requirements of clause 12, where relevant to the technology used. Some requirements can be verified by testing. Others can only be verified by inspection of the design and its accompanying documentation, because of the impracticability of testing all of the possible combinations of functions, and of establishing the long term reliability of the CIE.

In order to assist the process of design inspection, the manufacturer shall declare the following in writing.

- a) The design has been carried out in accordance with a quality management system, which incorporates a set of rules for the design of all elements of the CIE.
- b) that the components of the CIE have been selected for the intended purpose, and are expected to operate within their specification when the environmental conditions outside the cabinet of the CIE comply with class 3k5 of EN 60721-3-3:1995.

### 12.2 Documentation

**12.2.1** The manufacturer shall prepare installation and user documentation, which shall be submitted to the testing authority together with the CIE. This shall comprise at least the following.

- a) A general description of the equipment, including a list of the:
  - optional functions with requirements of this European Standard;
  - functions relating to other parts of EN 54;
  - ancillary functions not required by this European Standard.
- b) Technical specifications of the inputs and outputs of the CIE, sufficient to permit an assessment of the mechanical, electrical, and software compatibility with other components of the system (e.g. as described in EN 54-1), including where relevant:
  - the power requirements for recommended operation;
  - the maximum number of zones, points and/or addressable points per detection circuit;
  - the maximum number of zones, points, addressable points and/or fire alarm devices per CIE;
  - the maximum and minimum electrical ratings for each input and output;
  - information on the communication parameters employed on each transmission path;
  - recommended cable parameters for each transmission path;
  - fuse ratings.
- c) Installation information, including:
  - the suitability for use in various environments;
  - specified means to limit the consequences of faults (see 12.5.2);
  - if the c.i.e. is contained in more than one cabinet, how the requirements of 12.3.2 and 12.5.3 may be met;
  - mounting instructions;
  - instructions for connecting the inputs and outputs.
- d) Configuring and commissioning instructions.
- e) Operating instructions.
- f) Maintenance information.

**12.2.2** The manufacturer shall prepare design documentation, which shall be submitted to the testing authority together with the CIE. This documentation shall include drawings, parts lists, block diagrams, circuit diagrams and a functional description to such an extent that compliance with this European Standard may be checked and that a general assessment of the mechanical and electrical design is made possible.

**12.3 Mechanical design requirements**

**A1** 12.3.1 The cabinet of the CIE shall be of robust construction, consistent with the method of installation recommended in the documentation. It shall meet at least classification IP30 of EN 60529:1991 at access level 2. **A1**

**12.3.2** The CIE may be housed in more than one cabinet. If the documentation shows that the cabinets may be installed in locations distributed within the protected premises, then all of the mandatory manual controls and indicators shall be on one cabinet, or on cabinets declared to be only suitable for mounting adjacent to each other.

**12.3.3** All mandatory manual controls and light emitting indicators shall be clearly labelled to indicate their purpose. The information shall be legible at 0,8 m distance in an ambient light intensity from 100 lux to 500 lux.

**12.3.4** The terminations for transmission paths and the fuses shall be clearly labelled.

**12.4 Electrical and other design requirements**

**12.4.1** The CIE shall have provision for grouping the signals from points to provide zonal indications.

**12.4.2** The processing of signals shall give the highest priority to the indication of fire alarms.

**12.4.3** Transitions between the main and the standby power sources shall not change any indications and/or the state of any outputs, except those relating to the power supplies.

**12.4.4** If the CIE has provision for disconnecting or adjusting the main or the standby power source, this shall only be possible at access level 3 or 4.

**12.5 Integrity of transmission paths (see also annex H)**

**12.5.1** A fault in any transmission path between the CIE and other components of the fire detection system (as defined in EN 54-1) shall not affect the correct functioning of the CIE or of any other transmission path.

**12.5.2** Means, specified and provided, to limit the consequences of faults (short circuit or interruption) 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.

The manufacturer may specify a time shorter than 300 s. In this case, this specification shall be tested and verified.

**A1** NOTE For further explanation, see Annex H. **A1**

**A1** 12.5.3 If the manufacturer's documentation shows that a CIE contained in more than one cabinet may be installed in locations distributed within the protected premises, then means shall be specified and provided which ensure that a short circuit or an interruption in any transmission path between the cabinets does not affect more than one function (see Annex H) in more than one zone, for longer than 300 s following the occurrence of the fault.

The manufacturer may specify a time shorter than 300 s. In this case, this specification shall be tested and verified.

**12.5.4** If the CIE is designed to be used with a power supply (item L of Figure 1 of EN 54-1:1996) contained in a separate cabinet, then an interface shall be provided for at least two transmission paths to the power supply, such that a short circuit or an interruption in one transmission path does not prevent the supply of power to the CIE. **A1**

**12.6 Accessibility of indications and controls (see also annex A)**

**A1** 12.6.1 Four access levels shall be provided on the CIE from access level 1 (most accessible) to access level 4 (least accessible). Controls at a given access level shall not be accessible at a lower access level. **A1**

**12.6.2** All mandatory indications shall be visible at access level 1 without prior manual intervention (e.g. the need to open a door).

**12.6.3** Manual controls at access level 1 shall be accessible without special procedures.

**12.6.4** Indications and manual controls which are mandatory at access level 1 shall also be accessible at access level 2.

**12.6.5** The entry to access level 2 shall be restricted by a special procedure.

**12.6.6** The entry to access level 3 shall be restricted by a special procedure, differing from that for access level 2.

**12.6.7** The entry to access level 4 shall be restricted by special means which are not part of the CIE.

**12.7 Indications by means of light emitting indicators**

**12.7.1** Mandatory indications from light emitting indicators shall be visible in an ambient light intensity up to 500 lux, at any angle up to 22,5 degrees from a line through the indicator perpendicular to its mounting surface:

- at 3 m distance for the general indications of functional condition;
- at 3 m distance for the indication of the supply of power;
- at 0,8 m distance for other indications.

**A1** 12.7.2 If flashing indications are used, both the on period and the off period shall be greater than or equal to 0,25 s, and the frequencies of flash shall not be less than: **A1**

- 1 Hz for fire alarm indications;
- 0,2 Hz for fault indications.

**12.7.3** If the same light emitting indicators are used for the indication of specific faults and disablements, fault indications shall be flashing and disablement indications shall be steady.

## 12.8 Indications on alphanumeric displays

**12.8.1** If an alphanumeric display consists of elements or segments, the failure of one of these shall not affect the interpretation of the displayed information.

**12.8.2** Alphanumeric displays used for mandatory indications shall have at least one clearly distinguishable window, consisting of at least two clearly identifiable fields.

**12.8.3** If not included in the displayed information, the purpose of each field shall be clearly labelled.

**A1** 12.8.4 A field shall be capable of containing either:

- a) at least 16 characters where the display of a fire alarm uses a cross-reference to other information to identify the location or,
- b) at least 40 characters, where the display is intended to include the complete information on the location of a fire alarm.

**12.8.5** Mandatory indications on an alphanumeric display shall be legible for at least one hour following the display of a new indication of fire or fault, at 0,8 m distance, in ambient light intensities from 5 lux to 500 lux, at any angle from the normal to the plane of the display up to

- 22,5 degrees when viewed from each side,
- 15 degrees when viewed from above and below.

The indications shall be legible for at least one hour following the display of a new indication of fire and for at least 5 minutes for faults. Following this, the indications shall be legible at 100 lux to 500 lux, at the above distance and angles. It shall be possible to re-establish the legibility at 5 lux to 500 lux by means of a manual operation at access level 1. **A1**

## 12.9 Colours of indications

**12.9.1** The colours of the general and specific indications from light emitting indicators shall be as follows.

- a) Red for indications of:
  - fire alarms;

**A1** – the transmission of fire alarm signals to or reception of alarm confirmation signals from fire alarm routing equipment (item E of Figure 1 of EN 54-1:1996);

– the transmission of fire alarm signals to or reception of alarm confirmation signals from controls for automatic fire protection equipment (item G of Figure 1 of EN 54-1:1996). **A1**

b) Yellow for indications of:

- fault warnings;
- disablements;
- zones in the test state;

**A1** – the transmission of fault warning signals to fault warning routing equipment (item J of Figure 1 of EN 54-1:1996);

– delays to outputs as under 7.11.2. **A1**

c) Green for the indication that the CIE is supplied with power.

**12.9.2** The use of different colours is not necessary for indications on alphanumeric displays. However, if different colours are used for different indications, the colours used shall be as specified in 12.9.1.

## 12.10 Audible indications

**12.10.1** Audible indicators shall be part of the CIE. The same device may be used for fire alarm and fault warning indications.

**12.10.2** The minimum sound level, measured under anechoic conditions at a distance of 1 m, with any access door on the CIE closed, shall be:

- 60 dB(A) for fire alarm indications;
- 50 dB(A) for fault warning indications.

## 12.11 Testing of indicators

All mandatory visible and audible indicators shall be testable by a manual operation at access level 1 or 2.

## 13 Additional design requirements for software controlled control and indicating equipments

### 13.1 General requirements and manufacturer's declarations

The CIE may contain elements which are controlled by software in order to fulfil requirements of this European Standard. In this case, the CIE shall comply with the requirements of clause 13, as well as those of clause 12, where relevant to the technology used.

### 13.2 Software documentation

**13.2.1** The manufacturer shall prepare documentation which gives an overview of the software design, which shall be submitted to the testing authority together with the CIE. This documentation shall be in sufficient detail for the design to be inspected for compliance with this European Standard, and shall comprise at least the following.

- a) A functional description of the main program flow, including:
- a brief description of each module and the tasks it performs;
  - the way in which the modules interact;
  - the way in which the modules are called, including any interrupt processing;
  - the overall hierarchy of the program.

**[A1]** The functional description of the main program flow shall be explained using a clear methodology appropriate to the nature of the software, e.g. graphical representations of the system design, data flows and control flows.

- b) description of which areas of memory are used to store the program, site specific data and running data;

Where dynamic memory management is employed, a separation shall be implemented between the program, site specific data and running data and this shall be described in connection with the method of memory allocation. **[A1]**

- c) A description of how the software interacts with the hardware of the CIE.

**13.2.2** The manufacturer shall prepare and maintain detailed design documentation. This need not be submitted to the testing authority, but shall be available for inspection in a manner which respects the manufacturer's rights of confidentiality. This documentation shall comprise at least the following.

**[A1]** a) a description of each module of the program, as it is implemented in the source code of the program, containing the following: **[A1]**

- the name of the module;

**[A1]** *Text deleted* **[A1]**

- the date and/or version reference;
- a description of the tasks performed;
- a description of the interfaces, including the type of data transfer, the valid data range, and the checking for valid data.

b) The source code listing, including all global and local variables, constants and labels used, and sufficient comment for the program flow to be recognized.

c) Details of any software tools used in the preparation of the program (e.g. high level design tools, compilers, assemblers, etc.).

### 13.3 Software design

In order to ensure the reliability of the CIE the following requirements for software design shall apply.

- a) The software shall have a modular structure.
- b) The design of the interfaces for manually and automatically generated data shall not permit invalid data to cause an error in the program execution.
- [A1]** c) the software shall be designed to avoid the occurrence of a deadlock in the program flow.

### 13.4 Program monitoring (see also Annex I)

**13.4.1** The execution of the program shall be monitored as under **13.4.2** or **13.4.3**. If routines associated with the main functions of the program are no longer executed, either or both of the following shall apply:

- a) the CIE shall indicate a system fault (as in 8.5),
- b) the CIE shall enter the fault warning condition and indicate faults of affected supervised functions (as in **8.2.4**, **8.2.5**, **8.2.6** and **8.3**), where only these functions are affected.

**13.4.2** If the program executes in one processor, the execution of the routines as in **13.4.1** shall be monitored by a monitoring device as in **13.4.4**.

**13.4.3** If the program executes in more than one processor, the execution of the routines as in **13.4.1** shall be monitored in each processor. A monitoring device as in **13.4.4** shall be associated with one or more processors, and at least one such processor shall monitor the functioning of any processor not associated with such a monitoring device.

**13.4.4** The monitoring device of **13.4.2** and **13.4.3** shall have a timebase independent of that of the monitored system. The functioning of the monitoring device, and the signalling of a fault warning, shall not be prevented by a failure in the execution of the program of the monitored system.

**13.4.5** In the event of a system fault as specified in **13.4.1** a) or **13.6**, those parts of the CIE affected shall enter a safe state not later than the indication of the system fault. This safe state shall not result in the false activation of mandatory outputs. **[A1]**

**13.5 The storage of programs and data (see also Annex I)**

**13.5.1** All executable code and data necessary to comply with this European Standard shall be held in memory which is capable of continuous, unmaintained, reliable operation for a period of at least 10 years.

**13.5.2** For the program, the following requirements shall apply:

a) the program shall be held in non-volatile memory, which can only be written to at access level 4,

b) it shall be possible to identify the version reference or references of the program at access level 3. The version reference or references shall be in accordance with the documentation of **13.2.1**.

**13.5.3** For site specific data, the following requirements shall apply.

a) The alteration of site specific data shall only be possible at access level 3 or 4.

b) The alteration of site specific data shall not affect the structure of the program.

c) If stored in volatile memory, the site-specific data shall be protected against power loss by a back-up energy source which can only be separated from the memory at access level 4, and which is capable of maintaining the memory contents for at least 2 weeks.

d) If stored in read-write memory, there shall be a mechanism which prevents the memory being written to during normal operation at access level 1 or 2, such that its contents are protected during a failure in program execution.

e) It shall be possible either to read or interrogate the site specific data at access level 2 or 3, or the site specific data shall be given a version reference that shall be updated when each set of alterations is carried out.

f) If the site specific data has a version reference, it shall be possible to identify this at access level 2 or 3.

**13.6 The monitoring of memory contents**

The contents of the memories containing the site specific data shall be automatically checked at intervals not exceeding 1 h. The checking device shall signal a system fault if a corruption of the memory contents is detected.

**13.7 Operation of the c.i.e in the event of a system fault**

If the manufacturer's documentation shows that more than 512 fire detectors and/or manual call points may be connected to a CIE, in the event of a system fault, as specified in **13.4** or **13.6**, either or both of the following shall apply.

a) Not more than 512 fire detectors and/or manual call points and their associated mandatory functions shall be affected.

b) At least the following functions shall be provided in response to fire alarm signals from all fire detectors and/or manual call points.

– The indication of a fire alarm by means of the general fire alarm indicator and an audible indication.

– The operation of an output, as specified in **7.7.1**.

– The transmission of signals to fire alarm routing equipment (E of Figure 1 of EN 54-1:1996), if provided.

**14 Marking**

The CIE shall be marked with the following information, which shall be legible at access level 1.

a) The number of this European Standard EN 54-2.

b) The name or trademark of the manufacturer or supplier.

c) The type number or other designation of the CIE.

*Text deleted*

It shall be possible to identify a code or number which identifies the production period of the CIE at access level 1 or 2 or 3.

**15 Tests****15.1 General****15.1.1 Standard atmospheric conditions for testing**

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 described in EN 60068-1 as follows:

- |                      |                     |
|----------------------|---------------------|
| a) Temperature       | : 15 °C – 35 °C.    |
| b) Relative humidity | : 25 % – 75 %.      |
| c) Air pressure      | : 86 kPa – 106 kPa. |

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

**15.1.2 Specimen configuration**

The specimen configuration shall include at least one of each type of detection circuit, transmission path and internal circuits.

Unless it is designed only for one detection circuit then at least two detection circuits of each type shall be provided.

**15.1.3 Mounting and orientation**

Unless otherwise stated in a test procedure, the specimen shall be mounted in its normal orientation by the normal means of mounting indicated by the manufacturer. The equipment shall be in the condition of access level 1, except where otherwise required for functional testing.

**15.1.4 Electrical connection**

If the test procedure requires the specimen to be in the operating condition, it shall be connected to a power supply complying with the requirements in EN 54-4.

Unless otherwise required the power supply shall be in the nominal operating condition.

All detection circuits and transmission paths shall be connected to cables and equipment or to dummy loads. At least one of each type of detection circuit shall be maximum loaded, all within manufacturer's specification. Equipment other than the CIE may be kept in the standard atmospheric condition during the tests.

**A1 15.1.5 Provision for tests**

At least one CIE shall be provided for testing compliance with this standard.

The specimen(s) submitted shall be representative of the manufacturer's normal production and shall include the claimed options. <sup>A1</sup>

**15.2 Functional test****15.2.1 The object of the test**

The object of the functional test is to demonstrate the operation of the equipment before, during and/or after the environmental conditioning.

**15.2.2 Test schedule**

A test schedule shall be drawn up, which ensures that during the functional test each type of input function and each type of output function is exercised.

This shall include as a minimum tests of the fire alarm condition, the fault warning condition and the disabled condition.

**15.2.2.1 Fire alarm condition**

Initiate and reset a fire alarm from at least two zones (unless only one zone is provided).

Check that the correct indications and the correct outputs to C, E, and G (if provided) are given.

**15.2.2.2 Fault warning condition**

Initiate and reset fault warnings corresponding at least to:

- a) loss of one of the power sources;
- b) short circuit in a detection circuit;
- c) interruption in a detection circuit;
- d) interruption in a transmission path to C, E, and G if they are provided.

Check that the correct indications and the output to J (if provided) are given.

**15.2.2.3 Disabled condition**

- a) Disable and restore one zone.
- b) Disable and restore one transmission path to C, E, and G, where provided.

Check that the operation of the disablement controls result in the correct indication on the CIE, that only the relevant parts of the system are disabled and that on restoration of the disablements the function is restored.

**15.3 Environmental tests****A1 15.3.1 General**

More than one specimen may be supplied for environmental testing. The tests to be applied are shown in Table 1.

**15.3.2 Tests for one specimen**

If a single specimen is supplied for environmental testing, the specimen shall be subjected to all of the tests, which may be carried out in any order. A functional test shall be carried out before and after each environmental test. The functional test after one environmental test may be taken as the functional test before the next environmental test.

**15.3.3 Tests for more than one specimen**

If more than one specimen is supplied for environmental testing, then the tests may be divided between the specimens and carried out in any order. A functional test shall be carried out before and after each environmental test. For each specimen, the functional test after one environmental test may be taken as the functional test before the next environmental test. <sup>A1</sup>

<b>Table 1. Environmental tests</b>		
<b>Test</b>	<b>Operational or endurance</b>	<b>Sub-clause number</b>
Cold	Operational	<b>15.4</b>
Damp heat, steady state	Operational	<b>15.5</b>
Impact	Operational	<b>15.6</b>
Vibration, sinusoidal	Operational	<b>15.7</b>
Electromagnetic compatibility (EMC) immunity test	Operational	<b>15.8</b>
Supply voltage variations	Operational	<b>15.13</b>
Damp heat, steady state	Operational	<b>15.14</b>
Vibration, sinusoidal	Operational	<b>15.15</b>

**[A1] 15.3.4** *Text deleted* **[A1]****15.3.5 Requirements**

During the tests of **15.4** to **15.13** the specimen shall not change status in each of the functional conditions as specified in the corresponding clauses, except when such a change is required by the test procedure or when the change is a result of a functional test.

NOTE. In the tests of **15.8**, **15.10**, **15.11** and **15.12** visible and audible indications of purely transitory nature occurring during the application of the conditioning are allowed.

**[A1]** No mechanical damage to the specimen observed in the inspections specified in **15.4.2.6**, **15.5.2.6**, **15.6.2.6**, **15.7.2.6**, **15.14.2.5** and **15.15.2.5** shall jeopardise any of the mandatory functions specified in this European Standard. **[A1]**

**15.4 Cold (operational)****15.4.1 Object of the test**

The object of the test is to demonstrate the ability of the equipment to function correctly at low ambient temperatures appropriate to the anticipated service environment.

**15.4.2 Test procedure****[A1] 15.4.2.1 General**

The test procedures with gradual changes in temperature described in EN 60068-2-1 shall be used. Test Ad shall be used for heat-dissipating specimens (as defined in EN 60068-2-1) and test Ab shall be used for non-heat-dissipating specimens. **[A1]**

**15.4.2.2 Initial examination**

Before conditioning, subject the specimen to the functional test.

**15.4.2.3 State of the specimen during conditioning**

Mount the specimen as specified in **15.1.3** and connect it to suitable power supply-, monitoring- and loading equipment (see **15.1.4**).

The specimen shall be in the quiescent condition.

**15.4.2.4 Conditioning**

Apply the following severity of conditioning.

**Temperature** :  $-5^{\circ}\text{C} \cdot 3^{\circ}\text{C}$

**Duration** : 16 h.

**15.4.2.5 Measurements during conditioning**

Monitor the specimen during the conditioning period to detect any change in status. **During the last hour of the conditioning period, subject the specimen to the functional test.**

**15.4.2.6 Final measurements**

After the recovery period, subject the specimen to the functional test and inspect it visually for mechanical damage both externally and internally.

**15.5 Damp heat, steady state (operational)****15.5.1 Object of the test**

The object of the test is to demonstrate the ability of the equipment to function correctly at high relative humidities (without condensation) which may occur for short periods in the service environment.

**15.5.2 Test procedure****[A1] 15.5.2.1 General**

Use the test procedure described in EN 60068-2-78. **[A1]**

**15.5.2.2 Initial examination**

Before conditioning, subject the specimen to the functional test.

**15.5.2.3 State of the specimen during conditioning**

Mount the specimen as specified in **15.1.3** and connect it to suitable power supply-, monitoring- and loading equipment (see **15.1.4**).

The specimen shall be in the quiescent condition.

**15.5.2.4 Conditioning**

Apply the following severity of conditioning.

**Temperature** :  $40^{\circ}\text{C} \cdot 2^{\circ}\text{C}$ .

**Relative humidity** :  $(93^{+2}_{-3})\%$

**Duration** : 4 days.

**Precondition the specimen at the conditioning temperature ( $40^{\circ}\text{C} \cdot 2^{\circ}\text{C}$ ) until temperature stability has been reached to prevent the formation of water droplets on the specimen.**

**15.5.2.5 Measurements during conditioning**

Monitor the specimen during the conditioning period to detect any change in status. During the last hour of the conditioning period, subject the specimen to the functional test.

**15.5.2.6 Final measurements**

After the recovery period, subject the specimen to the functional test and inspect it visually for mechanical damage both externally and internally.

**15.6 Impact (operational)****15.6.1 Object of the test**

The object of the test is to demonstrate the immunity of the equipment to mechanical impacts upon the surface, which it may sustain in the normal service environment and which it can reasonably be expected to withstand.



**15.6.2 Test procedure****A1 15.6.2.1 General**

Apply the test apparatus and procedure described in EN 60068-2-75:1997, Test Ehb. **A1**

**15.6.2.2 Initial examination**

Before conditioning, subject the specimen to the functional test.

**15.6.2.3 State of the specimen during conditioning**

Mount the specimen as specified in **15.1.3** and connect it to a suitable power supply, monitoring and loading equipment (see **15.1.4**).

The specimen shall be in the quiescent condition.

**15.6.2.4 Conditioning**

Apply impacts to all surfaces of the specimen which are accessible at access level 1.

For all such surfaces three blows shall be applied to any point(s) considered likely to cause damage to or impair the operation of the specimen.

Care should be taken to ensure that the results from a series of three blows do not influence subsequent series.

In case of doubts, the defect shall be disregarded and a further three blows shall be applied to the same position on a new specimen.

Apply the following severity of conditioning.

Impact energy : (0,5 · 0,04) J.

Number of impacts per point : 3.

**15.6.2.5 Measurements during conditioning**

Monitor the specimen during the conditioning periods to detect any changes in functional condition, and to ensure that results of three blows do not influence subsequent series.

**15.6.2.6 Final measurements**

After the conditioning, subject the specimen to the functional test and inspect it visually for mechanical damage both externally and internally.

**15.7 Vibration, sinusoidal (operational)****15.7.1 Object of the test**

The object of the test is to demonstrate the immunity of the equipment to vibrations at levels appropriate to the service environment.

**15.7.2 Test procedure****A1 15.7.2.1 General**

Use the test procedure described in EN 60068-2-6. **A1**

NOTE. The vibration operational test may be combined with the vibration endurance test, so that the specimen is subjected to the operational test conditioning followed by the endurance test conditioning in each axis.

**15.7.2.2 Initial examination**

Before conditioning, subject the specimen to the functional test.

**A1 15.7.2.3 State of the specimen during conditioning**

Mount the specimen as specified in 15.1.3 and in accordance with EN 60068-2-47 and connect it to a suitable power supply, monitoring and loading equipment (see 15.1.4).

The specimen shall be in the quiescent condition. **A1**

**15.7.2.4 Conditioning**

Subject the specimen to vibration in each of the three mutually perpendicular axes in turn, one of which is perpendicular to the plane of mounting of the specimen.

Apply the following severity of conditioning.

a) Frequency range : 10 Hz to 150 Hz.

b) Acceleration amplitude : 0,981 m·s<sup>-2</sup> (0,1 g<sub>n</sub>).

c) Number of axes : 3.

d) Number of sweep cycles per axis : 1 for each functional condition.

**15.7.2.5 Measurements during conditioning**

Monitor the specimen during the conditioning periods to detect any changes in functional conditions.

**15.7.2.6 Final measurements**

After the conditioning, subject the specimen to the functional test and inspect it visually for mechanical damage both externally and internally.

**A1 15.8 Electromagnetic Compatibility (EMC), Immunity tests (operational)**

**15.8.1** The following EMC immunity tests shall be carried out, as described in EN 50130-4:

- mains supply voltage variations<sup>1)</sup>,
- mains supply voltage dips and interruptions<sup>1)</sup>,
- electrostatic discharge,
- radiated electromagnetic fields,
- conducted disturbances induced by electromagnetic fields,
- fast transient bursts,
- slow high energy voltage surges.

<sup>1)</sup> NOTE These tests are included as they should be applied to a PSE housed in the CIE (see 9.4.1 of EN 54-4:1997), or if the CIE includes other mains inputs for which these tests are applicable. **A1**



**A1**15.8.2 For the tests of 15.8.1, the criteria for compliance specified in EN 50130-4 and the following shall apply:

- a) the functional test, called for in the initial and final measurements, shall be the functional test described in 15.2,
- b) the required operating condition shall be as described in 15.1.4 and the equipment shall be tested in the quiescent condition,
- c) the connections to the various inputs and outputs shall be made with unscreened cables, unless the manufacturer's installation data specifies that only screened cables shall be used,
- d) in the electrostatic discharge test, the discharges shall be applied to parts of the equipment accessible at access level 2,
- e) in the fast transient burst test, the transients shall be applied to the a.c. mains lines by the direct injection method and to the other inputs, signal, data and control lines by the capacitive clamp method,
- f) if the equipment has a number of identical types of inputs or outputs, then the tests of 15.8.1 e), f), and g), and if applicable a) and b), shall be applied to one of each type.

15.9 *Text deleted*

15.10 *Text deleted*

15.11 *Text deleted*

15.12 *Text deleted* **A1**

### 15.13 Supply voltage variation (operational)

#### 15.13.1 Object of the test

The object of the test is to demonstrate the ability to function correctly over the anticipated range of supply voltage conditions.

#### 15.13.2 Test procedure

##### 15.13.2.1 General

No reference can be made to an international accepted standard at present.

The specimen shall be subjected to each of the specified power supply conditions until temperature stability is reached and the functional test has been conducted.

##### 15.13.2.2 Initial examination

Before conditioning subject the specimen to the functional test.

##### 15.13.2.3 State of the specimen during conditioning

Mount the specimen as specified in 15.1.3 and connect it to suitable power supply, monitoring and loading equipment (see 15.1.4).

The specimen shall be in the quiescent condition.

#### **A1**15.13.2.4 Conditioning

Apply the following conditions:

- a) supply of power at the maximum input voltage as specified by the manufacturer, or for a CIE with an integrated PSE the conditions specified in Table 1 of EN 54-4:1997,
- b) supply of power at the minimum input voltage as specified by the manufacturer, or for a CIE with an integrated PSE the conditions specified in Table 1 of EN 54-4:1997.

NOTE Compatibility between the CIE and any specific type of power supply equipment will require that the range of input voltages specified for the CIE includes the range of output voltages recorded for the power supply equipment in the tests of EN 54-4. **A1**

#### 15.13.2.5 Measurements during conditioning

Monitor the specimen at the supply voltage conditions until temperature stability is reached and subject the specimen to the functional test at each voltage condition.

#### 15.13.2.6 Final measurements

After the conditioning subject the specimen to the functional test.

### 15.14 Damp heat, steady state (endurance)

#### 15.14.1 Object of the test

The object of the test is to demonstrate the ability of the equipment to withstand the long term effects of humidity in the service environment (e.g. changes in electrical properties due to absorption, chemical reactions involving moisture, galvanic corrosion etc.).

#### 15.14.2 Test procedure

##### **A1**15.14.2.1 General

Use the test procedure described in EN 60068-2-78. **A1**

##### 15.14.2.2 Initial examination

Before conditioning, subject the specimen to the functional test.

##### 15.14.2.3 State of the specimen during conditioning

Mount the specimen as required in 15.1.3 and connect it to suitable power supply, monitoring and loading equipment (see 15.1.4). The specimen shall not be supplied with power during the conditioning.

##### 15.14.2.4 Conditioning

Apply the following severity of conditioning.

- a) Temperature : 40 °C · 2 °C.
- b) Relative humidity : (93  $\pm$  2)<sub>-3</sub> %
- c) Duration : 21 days.

Pre-condition the specimen at the condition temperature (40 °C · 2 °C) until temperature stability has been reached, to prevent the formation of water droplets on the specimen.

#### **15.14.2.5** *Final measurements*

After the recovery period, subject the specimen to the functional test and inspect it visually for mechanical damage both externally and internally.

### **15.15 Vibration, sinusoidal (endurance)**

#### **15.15.1** *The object of the test*

The object of the test is to demonstrate the ability of the equipment to withstand the long term effects of vibration at levels appropriate to the environment.

#### **15.15.2** *Test procedure*

##### **A1** 15.15.2.1 *General*

Use the test procedure described in EN 60068-2-6.<sup>A1</sup>

NOTE. The vibration endurance test may be combined with the vibration operational test, so that the specimen is subjected to the operational test conditioning followed by the endurance test conditioning in each axis in turn.

##### **15.15.2.2** *Initial examination*

Before conditioning subject the specimen to the functional test.

##### **A1** 15.15.2.3 *State of the specimen during conditioning*

Mount the specimen as required in 15.1.3 and in accordance with EN 60068-2-47 and connect it to a suitable power supply, monitoring and loading equipment (see 15.1.4). The specimen shall not be supplied with power during conditioning.<sup>A1</sup>

##### **15.15.2.4** *Conditioning*

Subject the specimen to vibration in each of the three mutually perpendicular axes in turn, one of which shall be perpendicular to the plane of mounting of the specimen.

Apply the following severity of conditioning.

- |                           |   |
|---------------------------|---|
| a) Frequency range        | : 10 Hz to 150 Hz.                                  |
| b) Acceleration amplitude | : $4,905 \text{ m}\cdot\text{s}^{-2}$ (0,5 $g_n$ ). |
| c) Number of axes         | : 3.  |
| d) Number of sweep cycles | : 20 per axis.                                      |

##### **15.15.2.5** *Final measurements*

After conditioning subject the specimen to the functional test and inspect it visually for mechanical damage both externally and internally.

## Annex A (informative)

### Explanation of access levels

This standard defines access levels for the indications and controls relating to mandatory functions. In some cases alternatives are offered (e.g. access level 1 or 2). This is because either may be appropriate in different operational circumstances. The purpose of the different access levels is not defined by this standard. However, in general they are expected to be used as follows.

Access level 1:

By members of the general public, or persons having a general responsibility for safety supervision, who might be expected to investigate and initially respond to a fire alarm or a fault warning.

Access level 2:

By persons having a specific responsibility for safety, and who are trained and authorized to operate the CIE in the:

- quiescent condition;
- fire alarm condition;
- fault warning condition;
- disabled condition;
- test condition.

Access level 3:

By persons who are trained and authorized to:

- re-configure the site specific data held within the CIE or controlled by it (e.g. labelling, zoning, alarm organization);
- maintain the CIE in accordance with the manufacturer's published instructions and data.

Access Level 4:

By persons who are trained and authorized by the manufacturer either to repair the CIE, or to alter its firmware, thereby changing its basic mode of operation.

**A1** 12.6 defines the minimum requirements for accessibility. Only access levels 1 and 2 have a strict hierarchy. Special procedures for entry to access level 2 and/or access level 3 are the use of: **A1**

- mechanical keys;
- A1** – a code of at least three manual sequential operations; **A1**
- access cards.

Examples of special means for entry to access level 4 are the use of:

- mechanical keys;
- tools;
- an external programming device.

It may be acceptable that the entry to access level 4 requires only a simple tool, such as a screwdriver, after access level 2 or 3 has been reached.

For example, the manufacturer may declare in his documentation which parts of the CIE are not user serviceable, and the entry to access level 4 may then be controlled by management of the user. It is also considered acceptable to use external tools to carry out certain functions at access level 3, e.g. to program site specific data.

It may be desirable in certain circumstances that the CIE has additional access levels within access level 2, or access level 3 (e.g. 2A and 2B), which would permit different classes of authorized user to have access to a selected group of controls or functions. This is not forbidden by this European Standard. The exact configuration will depend on the type of installation, the way the CIE is used, and the complexity of the functions provided.

## Annex B (informative)

### Optional functions with requirements and alternatives

This European Standard specifies mandatory functions and options with requirements. A CIE complying with this European Standard will need to fulfil the requirements of all of the mandatory functions, together with the requirements of those optional functions which are provided. The options described in this European Standard are currently used in the CEN member countries and have been incorporated into this European Standard in order to comply with application guidelines. They may also be called up in national codes of practice. Optional functions and their relevant clause numbers are listed in table B.1.

**Table B.1 Optional functions**

Option	See clause
Indications:	
Fault signals from points	<b>8.3</b>
Total loss of power supply	<b>8.4</b>
<b>A1</b> Alarm counter <b>A1</b>	<b>7.13</b>
Controls:	
<b>A1</b> Dependency on more than one alarm signal	<b>7.12</b>
Delays to outputs <b>A1</b>	<b>7.11</b>
Disablement of each address point	<b>9.5</b>
Test condition	<b>10</b>
Outputs:	
Fire alarm device(s)	<b>7.8</b>
Fire alarm routing equipment	<b>7.9</b>
Automatic fire protection equipment	<b>7.10</b>
Fault warning routing equipment	<b>8.9</b>
Standardized I/O interface	<b>11</b>

In addition, alternatives are offered in this European Standard. Examples of these are:

- automatic or manual reset of the fault warning condition;
- indications by means of separate light emitting indicators, or on an alphanumeric display;
- access level 1 or 2 for certain functions.

The choice of an alternative is entirely up to the manufacturer. They are equivalent solutions in this European Standard and should not be called up in national regulations.

## **Annex C (informative)**

### **Processing of signals from fire detectors**

Functions associated with other parts of EN 54 may be integrated within the design of a CIE. This may include the processing of signals from fire detectors to the point at which a fire alarm decision is taken. The design documentation needs to show where and how this decision is taken, so that these delays may be assessed. This would generally only be the case in a software controlled CIE.

For the purposes of this European Standard, the processing of the fire signals to this point is not considered to be a function of the CIE, but of the appropriate detector standard (e.g. EN 54-7 in the case of smoke detectors). Functions which are part of the CIE include:

- the scanning and acquisition of signals by the CIE from points;
- the control or scheduling of any processing of signals from points, where this is contained within the overall software structure of the CIE;
- any other processing required for indications and/or the actioning of outputs, subsequent to the fire alarm decision.

The intent of 7.1.3 and 7.1.4 is that the times associated with the above functions of the CIE do not add a delay of more than 10 s to the approved detector signal processing, either to indicate the fire alarm condition or a new zone in alarm. Demonstration of compliance may be achieved by inspection of the design documentation and/or by testing with suitable means, such as a simulated detector.

## **Annex D (informative)**

### **Explanation of zones and the zonal indication of fire alarms**

A zone will contain one or more fire detectors or manual call points, installed within a localized area of the protected premises. The requirements for grouping these into zones are more fully described in the application guidelines. In general, a protected premises is divided into zones in order to assist in:

- the rapid location of the source of a fire alarm;
- assessing the size of the fire, and monitoring its rate of growth;
- sub-dividing the installed system, for the purposes of alarm organization and fire protection measures.

The number of fire detectors and/or manual call points in a zone will vary, depending on the circumstances. More than one zone is not expected to be configured in a single volume, unless this is very large. It is assumed that a zone will not contain more than 32 fire detectors and/or manual call points, since this would correspond to an unacceptably large search area.

In this European Standard, zones are the mandatory units for the discrete indication of fire alarms. The aim is to provide unique indications for the zones in which fire alarms originate, so that a multiplicity of alarm signals from fire detectors in one volume do not clutter an alphanumeric display, and risk preventing the rapid recognition of new zones in alarm.

Zones may be sub-divided, such that signals from individual points, or groups of points, may also be identified at the CIE, thus providing more detailed information on the location of an event, in addition to the indication of the affected zone.

## **A1) Annex E (informative)**

### **Delays to outputs**

#### **E. 1 General**

7.11, which deals with delays to output signals, permits a CIE to be configured, at access level 3, so that the presence of a fire may be verified following an alarm, before automatic actions or an orderly evacuation of persons are carried out.

If the manufacturer declares that fire detectors and manual call points may be included in the same zone, and output delays may also be operative, the CIE needs to be capable of distinguishing signals from manual call points from signals from fire detectors, in order that the requirements of 7.11.1.a) may be met.

The maximum delay times quoted represent the upper limit of times currently used in the EU Member States and are not recommended times. Recommended times are given in application guidelines. Delays to signals from manual call points should be used only in exceptional circumstances.

Delays may be structured such that an initial short delay period may be extended by the use of a manual control, but the total delay should not exceed the specified maximum. It may also be desirable that the operation of any manual call point on the installation can override the delay, so that an alarm can be immediately raised if human inspection of an incident verifies that a fire exists. A1

**A1** In the first published version of this European Standard, it was required that delays to outputs be capable of being enabled and disabled, and delays indicated as a disablement. In this amended standard it is recognised that delays may be permanently configured as the normal mode of operation of the equipment, and in such cases there is no need for a user control and no indication need be given. However, if (as under 7.11.2) there is provision at access level 2 to switch on delays (which may be in addition to delays which are normally configured), this state shall be indicated. It is common practice to switch on delays by a manual operation and to switch them off with a programmable timer, which should ideally have at least a 7 day capability. This is often referred to as “day/night” mode of operation. Such a mode need not only relate to switching delays on and off, but may also be used to change other operational parameters of the system (e.g. the sensitivity of fire detectors), provided that this complies with requirements in other Parts of EN 54.

## **E.2 Dependency on more than one alarm signal (option with requirement)**

7.12 permits a CIE to be configured at access level 3 so that the entry to the fire alarm conditions, or automatic actions associated with a fire alarm, are dependent on more than one alarm signal. The intention is to reduce the incidence of unwanted alarms and/or to minimise their implications. Three general types of dependency are permitted, and these are briefly explained below. It is not precluded that more than one type may be used concurrently, e.g. type A could be combined with type B or type C. For information on the appropriate type(s) to be employed in given circumstances, reference should be made to application guidelines.

Type A dependency (7.12.1) provides for delayed operation following a first fire signal, which would normally be interpreted as a fire alarm. The entry to the fire alarm condition usually occurs on the receipt of further fire signals from the same fire detector. A common technique with 2-state smoke detectors is to automatically reset the zone following the first fire signal, then interpret a subsequent fire signal as a fire alarm. Alternative signal processing techniques may also be employed. One aim is to permit a transient concentration of aerosol (e.g. fumes from cooking) to dissipate naturally, or be cleared by a person before resulting in a fire alarm. The CIE should be capable of receiving a second fire signal from the same fire detector within 60 s, and this effectively sets the maximum processing delays which may be introduced within the CIE and the fire detector.

There is no requirement to provide an indication of the first fire signal, but in some applications it may be appropriate to provide a local (e.g. an audible) warning. The benefits are reduced if the time period for dependency following a first fire signal is too long, and a maximum of 30 min is specified.

Type B dependency (7.12.2) provides for the entry to the fire alarm condition to depend on a fire signal from two or more fire detectors. In this case, the first fire signal should be indicated, but not in the same manner as in the fire alarm condition. Except in special cases, fire detectors should be located in the same fire volumes, i.e. with smoke detectors the combustion products should be free to diffuse from a source of combustion to more than one fire detector or identifiable sampling point, and with flame detectors the source of a fire should be visible from more than one detector. If the fire detectors are in different zones, these zones are co-sited in such a way as to meet the above criteria. It should be possible to manually cancel the first alarm state at access level 2. The first alarm state may also be automatically cancelled with a minimum dependency time period of 5 min. This time period depends on the fire detection application, and it may need to be significantly longer to detect slowly developing fires.

Type C dependency (7.12.3) also depends on a fire signal from two or more points, but these may be fire detectors or manual call points. In this case, the CIE enters the fire alarm condition on the first alarm, but the activation of mandatory outputs may be inhibited. In the case of fire detectors, the same siting considerations apply as for type B dependency. Delays to outputs (as under 7.11) are commonly used in conjunction with type C dependency, to provide for the automatic activation of outputs if a fire signal is not received before the delay expires. **A1**

## Annex F (informative)

### Fault recognition and indication

Clause 8 requires that the faults most likely to occur in a fire alarm system can be recognized and indicated, so that they may be repaired as soon as possible. These include the following.

- Certain faults within the CIE itself, and in transmission paths between parts of the CIE contained in more than one cabinet.
- Faults in transmission paths to other components of an installed system, where these are in different cabinets to that of the CIE.
- Faults in other components of an installed system, as defined in EN 54-1.

The faults fall into 3 classes, which are described in the relevant sub-clauses:

- 8.2 and 8.3, faults in specified functions;
- 8.4, total loss of power supply (option with requirements);
- 8.5, system fault.

These classes differ in the implications of the fault, hence the reason for the different requirements. Faults as under 8.2 and 8.3 are assumed to affect only the specified function, the rest of the c.i.e. and its connected system remaining fully operational. Faults as under 8.4 and 8.5 may lead to a partial or total loss of all the functions of the CIE.

This European Standard does not define the technical means for recognizing faults. It defines those faults which are to be recognized and how these are to be indicated. For example, the monitoring for short circuits or interruptions in transmission paths may be carried out by the CIE or by other components of the connected system. However, all the recognized faults have to be indicated on the CIE.

The monitoring for faults within other components of the installed system may be at intervals less frequent than 100 s. The CIE has to indicate a fault within 100 s of receiving a signal from this component.

Both automatic and manual reset are possible on the same CIE, since it may be desirable that certain fault indications reset automatically, whilst others are latched until a manual reset. In the case of a system fault only a manual reset is permitted, because of the special implications.

## Annex G (informative)

### Standardized input/output interface for the connection of ancillary equipment (e.g. a fire brigade panel)

The input/output interface is an optional part of the CIE which transmits information on the status of the CIE to ancillary equipment. It is also capable of receiving signals and actioning the appropriate functions on the CIE. The ancillary equipment is not a part of the CIE. for the purposes of this European Standard, although it may be mechanically integrated with the CIE in the same cabinet.


Clause 11 specifies the functions which are to be included in the interface. All the specified functions are to be included if a manufacturer declares compliance with this option. The requirements for fire brigade panels differ within the CEN countries, because of differences in national fire fighting practices. Rather than attempting to harmonize fire brigade panels at a European level, an interface has been specified which implements the more common functions used in the CEN countries. Consequently, more input and output functions have been specified than may be needed for any given piece of equipment.

It may not be necessary to call up this option for the connection of ancillary equipment (e.g. a fire brigade panel) which conforms to specific application guidelines or local regulations. As an option without requirements a sub-set of the functions listed may be provided for this purpose.

No electrical specifications for the interface are given in this European Standard. 12.2.1b requires that the manufacturer's technical documentation gives sufficient information to permit the specification of compatible ancillary equipment.

## Annex H (informative)

### Integrity of transmission paths

12.5.2 relates to providing a capability in the CIE to limit the consequences of faults in detection circuits and in other transmission paths. Accepted consequences of faults are specified in national guidelines for planning, design and installation of fire detection and fire alarm systems (codes of practice), etc. and may be different in different countries. The means referred to may be that the manufacturer may declare a maximum number of points to be connected to a transmission path (e.g. that points on a detection circuit should cover only one zone), or that components performing only certain functions may be connected to a transmission path. If physical means are used, at least the following measures should be taken: 

**A1)** – the relevant detection circuits, or transmission paths, should be capable of being installed as loops,

- the interfaces of the CIE should be capable of independently powering and receiving signals from each end of a loop,
- compatible devices should be available for installation on detection circuits, or transmission paths, which are capable of automatically isolating short circuits. The devices may be physically incorporated with other components covered by appropriate Parts of EN 54.

**12.5.3** relates to limiting the consequences of faults in transmission paths between different parts of a CIE contained in more than one cabinet. In this case, it is likely that physical means will be necessary in order to limit the consequences of a fault. The functions referred to are those of the components of Figure 1 of EN 54-1:1996 (e.g. fire detectors, manual call points, fire alarm devices).

## Annex I (informative)

### Design requirements for software controlled control and indicating equipments

The CIE may incorporate software controlled elements, which are required to fulfil mandatory requirements of the European Standard but which are supplied to the manufacturer. A good example is an alphanumeric display module, but there are many possibilities, including both physical modules and embedded software (e.g. operating systems). Such elements may be traded world-wide as commodity items, and detailed software documentation (and details of the hardware design) may not be available to the CIE manufacturer. It is not the intention of this European Standard to forbid the use of appropriate technology, and in such cases the detailed requirements for documentation and design of **13.2** and **13.3** may be relaxed, as long as sufficient information is provided to allow performance to be evaluated. However, it is expected that products from third parties which are designed and produced exclusively for a CIE are fully documented and fulfil the requirements. The manufacturer has to ensure that the element is of proven reliability and is suitable for the application. Proven reliability can be assumed if the components under question are freely available on the market and there is sufficient field experience (e.g.  $\geq 1$  year). The interface with the main application has to be clearly and comprehensively specified, and this documentation has to be available to the testing authority. **A1)**

**A1) 13.4** deals with program monitoring. The program is the software necessary for the CIE to carry out mandatory functions (including any declared options with requirements). The execution of the entire program has to be monitored. Monitoring can be carried out either by means of a hardware watchdog system or by another processor. The program may include software which runs in more than one processor and software in elements supplied to the manufacturer. The degree of monitoring should be sufficient to ensure that the CIE is able to meet the requirements of this standard. In the case of an alphanumeric display module, it is considered to be sufficient to routinely check that data written to the module may be read back from it.

**13.4.5** requires that, in the event of a failure of program execution, the CIE shall enter a safe state. The safe state is defined by the manufacturer, but should not result in the false activation of mandatory outputs, nor give a false impression to a user that the CIE remains operational if it is not. In practice, it may be acceptable either to stop, or automatically restart, the program execution. If there is a possibility that memory may have been corrupted, the restart procedure should check the contents of this memory, and if necessary re-initialise running data to ensure that the CIE enters a safe operating state. Even if program execution is successfully restarted, it is important that the user is made aware of the incident. For this reason it may be advantageous for the CIE to be capable of automatically recording details of the restart event. In any event the system fault indication has to be latched until a manual intervention.

**13.5.1** requires that all executable code and data necessary to comply with this European Standard are held in memory which is capable of continuous, non-maintained, reliable operation for a period of at least 10 years. In the existing state of the art, memory with moving mechanical parts is not believed to be sufficiently reliable. For example the use of tapes, or magnetic or optical data discs, for the storage of programs and data could therefore not be considered to be acceptable at the time of drafting this European Standard. **A1)**

**A1) Annex ZA (informative)****Clauses addressing the provisions of the EU Construction Products Directive (89/106/EEC)****ZA.1 Scope and relevant clauses**

This European Standard has been prepared under Mandate M/109 given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European Standard, shown in this annex, meet the requirements of the mandate given under the EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness (as defined by the Construction Products Directive) of the construction product covered by this European Standard for its intended use according to Clause 1 (Scope) of this standard; reference shall be made to the information given with the CE marking (see ZA.3).

**WARNING — Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.**

**NOTE** In addition to any specific clauses relating to dangerous substances contained in this standard, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). These requirements need also to be complied with, when and where they apply. An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (accessed through <http://europa.eu.int>).

This Annex ZA has the same scope, in relation to the products covered, as Clause 1 of this standard. This annex establishes the conditions for the CE marking of control and indicating equipment intended for the use shown below and identifies the relevant clauses applicable.

Construction Product: Control and indicating equipment for fire detection and fire alarm systems for buildings.

Intended use: Fire safety.

**Table ZA.1 — Relevant clauses**

Essential characteristics	Clauses in this European Standard	Mandated level(s) or class(es)	Notes
Performance under fire conditions	4, 5, 7	None	a), b)
Response delay (response time to fire)	7.1, 7.7, 7.11, 7.12		a)
Operational reliability	4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14		a)
Durability of operational reliability, Temperature resistance	15.4		
Durability of operational reliability, Vibration resistance	15.6, 15.7, 15.15		
Durability of operational reliability, Electrical stability	15.8 to 15.13		
Durability of operational reliability: humidity resistance	15.5, 15.14		

<sup>a)</sup> For compliance with this standard it is not necessary to provide the optional functions specified in the standard. However, if a manufacturer chooses to include any of these options in the equipment, then the associated requirements shall be met and have to be included in type testing and certification (see Clause 4 of this standard).

<sup>b)</sup> The products covered by this standard are assumed to function during the alarm condition, in an event of fire, before the fire becomes so large as to affect their functioning. There is therefore no requirement to function when exposed to direct attack from fire.

**A1**



## **A1** ZA.2 Procedures for the attestation of conformity of control and indicating equipment covered by this standard

### ZA.2.1 System of attestation of conformity

The mandate requires that the attestation of conformity system to be applied shall be that shown in Table ZA.2.

**Table ZA.2 — Attestation of conformity system**

Product	Intended use	Levels or classes	Attestation of conformity system
Fire detection/fire alarm: control and indicating equipment	Fire safety	None	1
System 1: See CPD Annex III.2.(i), without audit-testing of samples by the notified body.			

### ZA.2.2 Evaluation of conformity

#### ZA.2.2.1 General

The evaluation of conformity of the product with the requirements of this European Standard shall be demonstrated by:

- a) Tasks to be provided by the manufacturer:
  - 1) factory production control,
  - 2) testing of samples by the manufacturer in accordance with a prescribed test plan,
- b) Tasks to be undertaken under the responsibility of a Notified Product Certification Body:
  - 1) type testing of the product,
  - 2) initial inspection of the factory and factory production control,
  - 3) periodic surveillance, assessment and approval of the factory production control.

**NOTE** The manufacturer is a natural or legal person, who places the product on the market under his own name. Normally, the manufacturer designs and manufactures the product himself. As a first alternative, he may have it designed, manufactured, assembled, packed, processed or labelled by subcontracting. As a second alternative he may assemble, pack, process, or label ready-made products.

The manufacturer shall ensure:

- that the initial type testing in accordance with this European Standard is initiated and carried out under the responsibility of a notified product certification body, and
- that the product continuously complies with the initial type testing samples, for which compliance with the European Standard in question has been verified.

He shall always retain the overall control and shall have the necessary competence to take the responsibility for the product. The manufacturer shall be fully responsible for the conformity of the product to all relevant regulatory requirements.

#### ZA.2.2.2 Type testing

**ZA.2.2.2.1** Type testing shall be performed to demonstrate conformity with this European Standard.

Type testing of the product shall be carried out in accordance with the clauses shown in Table ZA.1, except as described in **ZA.2.2.2.2** and **ZA.2.2.2.3**.

**ZA.2.2.2.2** Tests previously performed, such as type tests for product certification, may be taken into account providing that they were made to the same or a more rigorous test method under the same system of attestation of conformity as required by this standard on the same product or products of similar design, construction and functionality, such that the results are applicable to the product in question.

**NOTE** Same system of attestation of conformity means testing by an independent third party under the responsibility of a product certification body which is now a notified product certification body. **A1**

**A1) ZA.2.2.2.3** Where one or more characteristics are the same for products with similar design, construction and functionality, then the results of tests for these characteristics on one product may be applied to the other similar product or products.

**ZA.2.2.2.4** Test samples shall be representative of the normal production. If the test samples are prototypes, they shall be representative of the intended future production and shall be selected by the manufacturer.

**NOTE** In the case of prototypes and third party certification, this means that it is the manufacturer not the product certification body who is responsible for selecting the samples. During the initial inspection of the factory and of the factory production control (see **ZA.2.2.3.4**), it is verified that the type tested samples are representative of the product being produced.

**ZA.2.2.2.5** All type testing and its results shall be documented in a test report. All test reports shall be retained by the manufacturer for at least ten years after the last date of production of the product to which they relate.

### **ZA.2.2.3 Factory production control**

#### **ZA.2.2.3.1 General**

FPC is the permanent internal control of production exercised by the manufacturer.

All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures. This production control system documentation shall ensure a common understanding of conformity evaluation and enable the achievement of the required product characteristics and the effective operation of the production control system to be checked.

Factory production control therefore brings together operational techniques and all measures allowing maintenance and control of the conformity of the product with its technical specifications. Its implementation may be achieved by controls and tests on measuring equipment, raw materials and constituents, processes, machines and manufacturing equipment and finished products, including material properties in components, and by making use of the results thus obtained.

#### **ZA.2.2.3.2 General requirements**

The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed on the market conform to the stated performance characteristics and the samples subjected to type testing.

Where subcontracting takes place, the manufacturer shall retain the overall control of the product and ensure that he receives all the information that is necessary to fulfil his responsibilities according to the European Standard in question. If the manufacturer has part of the product designed, manufactured, assembled, packed, processed and/or labelled by subcontracting, the FPC of the subcontractor may be taken into account, where appropriate for the product in question. The manufacturer who subcontracts all of his activities may in no circumstances pass these responsibilities on to a subcontractor.

The FPC system shall fulfil the requirements as described in the following clauses of EN ISO 9001:2000, where applicable:

- 4.2 except 4.2.1a),
- 5.1 e), 5.5.1, 5.5.2,
- Clause 6,
- 7.1 except 7.1 a), 7.2.3 c), 7.4, 7.5, 7.6,
- 8.2.3, 8.2.4, 8.3, 8.5.2.

The FPC system may be part of an existing Quality Management system (e.g. in accordance with EN ISO 9001:2000), the scope of which covers the manufacture of the product.

Where a quality management system is certified in accordance with EN ISO 9001:2000, by a certification body which is now a notified body, then the assessment reports of this quality management system should be taken into account with respect to these clauses.

#### **ZA.2.2.3.3 Product specific requirements**

The FPC system shall:

- address this European Standard, and
- ensure that the products placed on the market conform to the stated performance characteristics.

The FPC system shall include a product specific FPC- or Quality-plan, which identifies procedures to demonstrate conformity of the product at appropriate stages, i.e.:

- a) the controls and tests to be carried out prior to and/or during manufacture according to a frequency laid down, and/or
- b) the verifications and tests to be carried out on finished products according to a frequency laid down. **A1**

**A1**) If the manufacturer uses only finished products, the operations under b) shall lead to an equivalent level of conformity of the product as if FPC had been carried out during the production.

If the manufacturer carries out parts of the production himself, the operations under b) may be reduced and partly replaced by operations under a). Generally, the more parts of the production that are carried out by the manufacturer, the more operations under b) may be replaced by operations under a). In any case the operation shall lead to an equivalent level of conformity of the product as if FPC had been carried out during the production.

**NOTE** Depending on the specific case, it can be necessary to carry out the operations referred to under a) and b), only the operations under a) or only those under b).

The operations under a) centre as much on the intermediate states of the product as on manufacturing machines and their adjustment, and measuring equipment etc. These controls and tests and their frequency shall be chosen based on product type and composition, the manufacturing process and its complexity, the sensitivity of product features to variations in manufacturing parameters etc.

The manufacturer shall establish and maintain records that provide evidence that the production has been sampled and tested. These records shall show clearly whether the production has satisfied the defined acceptance criteria and shall be available for at least three years. These records shall be available for inspection.

Where the product fails to satisfy the acceptance measures, the provisions for non-conforming products shall apply, the necessary corrective action shall immediately be taken and the products or batches not conforming shall be isolated and properly identified. Once the fault has been corrected, the test or verification in question shall be repeated.

The results of controls and tests shall be properly recorded. The product description, date of manufacture, test method adopted, test results and acceptance criteria shall be entered in the records under the signature of the person responsible for the control/test. With regard to any control result not meeting the requirements of this European Standard, the corrective measures taken to rectify the situation (e.g. a further test carried out, modification of manufacturing process, throwing away or putting right of product) shall be indicated in the records.

Individual products or batches of products and the related manufacturing documentation shall be completely identifiable and retraceable.

#### **ZA.2.2.3.4 Initial inspection of factory and FPC**

Initial inspection of FPC shall be carried out when the production process has been finalised and preferably in operation. The factory and FPC-documentation shall be assessed to verify that the requirements of **ZA.2.2.3.1** and **ZA.2.2.3.2** are fulfilled.

In the assessment it shall be verified:

- a) that all resources necessary for the achievement of the product characteristics required by this European Standard are or will be available, and
- b) that the FPC-procedures in accordance with the FPC-documentation are or will be implemented and followed in practice, and
- c) that the product complies or will comply with the initial type testing samples, for which compliance with this European Standard has been verified.

All locations where final assembly or at least final testing of the relevant product is performed, shall be assessed to verify that the above conditions a) to c) are in place.

If the FPC system covers more than one product, production line or production process, and it is verified that the general requirements are fulfilled when assessing one product, production line or production process, then the assessment of the general requirements does not need to be repeated when assessing the FPC for another product, production line or production process.

Provided that the production process is similar, assessments previously performed in accordance with the provisions of this standard may be taken into account providing that they were made to the same system of attestation of conformity on the same product or products of similar design, construction and functionality, such that the results may be considered applicable to the product in question.

**NOTE** Same system of attestation of conformity means inspection of FPC by an independent third party under the responsibility of a product certification body which is now a notified product certification body.

All assessments and their results shall be documented in a report. **A1**

#### **A1 ZA.2.2.3.5 Periodic surveillance of FPC**

Surveillance of the FPC shall be undertaken once a year.

The surveillance of the FPC shall include a review of the quality plan(s) and production processes(s) for each product to determine if any changes have been made since the last assessment or surveillance and the significance of any changes shall be assessed.

Checks shall be made to ensure that the quality plans are still correctly implemented and that the production equipment is still correctly maintained and calibrated.

The records of tests and measurement made during the production process and to finished products shall be reviewed to ensure that the values obtained still correspond with those values for the samples submitted to type testing and that the correct actions have been taken for non-compliant devices.

The surveillance of the FPC may be carried out as part of a surveillance or reassessment of a Quality Management system (e.g. in accordance with EN ISO 9001:2000).

#### **ZA.2.2.4 Procedure for modifications**

If modifications are made to the product, production process or FPC system that could affect any of the product characteristics required by this standard, then all characteristics covered by the clauses shown in Table ZA.1, which may be changed by the modification, shall be subject to type testing or engineering evaluation, except as described in ZA.2.2.2.3 and ZA.2.2.2.4. Where relevant, a re-assessment of the factory and of the FPC system shall be performed for those aspects, which may be affected by the modification.

All assessments and their results shall be documented in a report.

### **ZA.3 CE marking and labelling and accompanying documentation**

The manufacturer, or his authorised representative established in the EEA, is responsible for the affixing of the CE marking. The CE-marking symbol (in accordance with Directive 93/68/EEC) shall be placed on the product and be accompanied by the number of the EC certificate of conformity and the Notified Product Certification Body number. If the Notified Body number is included as part of the number of the EC certificate of conformity, then the number of the EC certificate of conformity is sufficient.


The CE marking symbol shall in addition be shown on the accompanying commercial documentation supplemented by:

- 1) identification number of the Notified Product Certification Body,
- 2) name or identifying mark and registered address of the manufacturer,
- 3) last two digits of the year in which the marking was affixed,
- 4) number of the EC certificate of conformity,
- 5) reference to this European Standard (EN 54-2), its date and any amendments,
- 6) list of optional functions with requirements (see 12.2.1a),
- 7) description of the construction product (i.e. Control and indicating equipment for fire detection and fire alarm systems for buildings),
- 8) type/model designation of the product,
- 9) other information required by 12.2.1 or a reference to a document, which shall be uniquely identifiable and available from the manufacturer, containing this information.

NOTE Reference to a separate document is permitted only where the quantity of information would be so large that it could not practically be included in the commercial documentation accompanying the product.

Where the product exceeds the minimum performance levels stated in this standard, and where the manufacturer so desires, the CE marking may be accompanied by an indication of the parameter(s) concerned and the actual test result(s).

Figure ZA.1 gives an example of the information to be given in the accompanying commercial documentation. **A1**

 0123
AnyCo Ltd, P.O. Box 21, B1050  06  0123 – CPD – 002
EN 54-2  Control and indicating equipment for fire detection and fire alarm systems for buildings  ABC 123  Provided options:  Output to C  Fault signals from points  Output to fire alarm devices  Other technical data: see Doc.123/2006 held by the manufacturer

**Figure ZA.1 — Example of CE marking information in the accompanying commercial documentation**

#### **ZA.4 EC certificate and declaration of conformity**

The manufacturer, or his authorised representative established in the EEA, shall prepare and retain a declaration of conformity, which authorises the affixing of the CE marking. This declaration shall include:

- name and address of the manufacturer, or his authorised representative established in the EEA, and the place of production,  
NOTE 1The manufacturer may also be the person responsible for placing the product onto the EEA market, if he takes responsibility for CE marking.
- description of the construction product (i.e. power supply equipment for fire detection and fire alarm systems for buildings) and a copy of the information accompanying the CE marking,  
NOTE 2Where some of the information required for the Declaration is already given in the CE – marking information, it does not need to be repeated.

- type/model designation of the product,
- provisions to which the product conforms (i.e. Annex ZA of this EN),
- any particular conditions applicable to the use of the product (if necessary),
- name and address (or identification number) of the Notified Product Certification Body,
- name of and position held by the person empowered to sign the declaration on behalf of the manufacturer or of his authorized representative.  $\sqrt{A_1}$

**A1)** The declaration shall contain a certificate of conformity with the following information:

- name and address of the Notified Product Certification Body,
- certificate number,
- name and address of the manufacturer, or his authorised representative established in the EEA,
- description of the construction product (i.e. power supply equipment for fire detection and fire alarm systems for buildings),
- type/model designation of the product,
- provisions to which the product conforms (i.e. Annex ZA of this EN),
- any particular conditions applicable to the use of the product (if necessary),
- any conditions of validity of the certificate, where applicable,
- name of and position held by the person empowered to sign the certificate.

The above-mentioned declaration and certificate shall be presented (if requested) in the language or languages accepted in the Member State in which the product is to be used. **A1)**

## **Ⓐ Bibliography**

[1] EN ISO 9001:2000, Quality management systems — Requirements (ISO 9001:2000) **Ⓐ**

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