

# Fire detection and fire alarm systems —

## Part 4: Power supply equipment

The European Standard EN 54-4:1997, with the incorporation of amendment A1:2002 and A2:2006, has the status of a British Standard

ICS 13.220.20

## National foreword

This British Standard is the English language version of EN 54-4:1997, including amendments A1:2002 and A2:2006. Together with BS EN 54-2:1997, it supersedes BS 5839-4:1988 which is withdrawn.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 **A1** **A1**. 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, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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

### Cross-references

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### Summary of pages

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English version

## Fire detection and fire alarm systems — Part 4: Power supply equipment

Systèmes de détection et d'alarme incendie — Brandmeldeanlagen —  
Partie 4: Equipement d'alimentation électrique Teil 4: Energieversorgungseinrichtungen

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.

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# 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 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 August 1999. 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 54-4:1997/A1:2002) 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 54-4:1997 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2003, and conflicting national standards shall be withdrawn at the latest by December 2005.

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.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## Foreword to amendment A2

This document (EN 54-4:1997/A2:2006) 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 54-4:1997 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2007, and conflicting national standards shall be withdrawn at the latest by August 2009.

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 2 to this standard improves the additional requirements for integrated power supplies 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 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 European Standard is drafted on the basis of functions which are to be provided on all power supply equipment. The power supply equipment may have its own cabinet, or may be housed with other equipment of the fire detection and fire alarm system, such as the control and indicating equipment of EN 54-2. A fire detection and fire alarm system may use more than one power supply equipment.

## 1 Scope

Ⓐ This European Standard specifies requirements, methods of test and performance criteria for power supply equipment of fire detection and fire alarm systems installed in buildings. This includes component L of Figure 1 of EN 54-1:1996 and power supply equipment that supplies power directly to components other than the control and indicating equipment, unless otherwise specified in other Parts of EN 54. Ⓐ

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

Ⓐ EN 54-1:1996, *Fire detection and fire alarm systems — Part 1: Introduction*

EN 54-2:1997, *Fire detection and fire alarm systems — Part 2: Control and indicating equipment*

EN 54-7:2000, *Fire detection and fire alarm systems — Part 7: Smoke detectors — Point detectors using scattered light, transmitted light or ionization*

EN 50130-4:1995, *Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder and social alarm systems*

EN 60068-1:1994, *Environmental testing — Part 1: General and guidance (IEC 60068-1:1988 + corr. October 1988 + A1:1992)*

EN 60068-2-1:1993, *Environmental testing; part 2: tests; tests A: cold (IEC 60068-2-1:1990)*

EN 60068-2-6:1995, *Environmental testing — Part 2: Tests — Test Fc: Vibration (sinusoidal) (IEC 60068-2-6:1995 + Corrigendum 1995)*

EN 60068-2-47:2005, *Environmental testing — Part 2-47: Test — Mounting of specimens for vibration, impact and similar dynamic tests (IEC 60068-2-47:2005)*

EN 60068-2-75:1997, *Environmental testing — Part 2-75: Tests — Test Eh: Hammer tests (IEC 60068-2-75:1997)*

EN 60068-2-78:2001, *Environmental testing — Part 2-78: Tests — Test Cab: Damp heat, steady state (IEC 60068-2-78:2001)*

EN 60529:1991, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN 60721-3-3:1995, *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) Ⓐ*

### 3 Definitions and abbreviations

#### **A2** 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 54-1:1996 and the following apply.

##### 3.1.1

##### **final voltage**

lowest voltage, specified by the battery manufacturer, to which a battery should be discharged

##### 3.1.2

##### **fully charged voltage**

highest voltage which characterises a fully charged battery as specified by the battery manufacturer

##### 3.1.3

##### **I max. a**

rated maximum output current which can be supplied continuously

##### 3.1.4

##### **I max. b**

rated maximum output current higher than I max. a, which can be supplied while battery charging is not required

##### 3.1.5

##### **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 **A2**

#### 3.2 Abbreviations

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

**A2** PSE: power supply equipment (L of Figure 1 of EN 54-1)

CIE: control and indicating equipment (B of Figure 1 of EN 54-1) **A2**

### 4 General requirements

#### 4.1 Conformity

In order to conform to this standard, the **A2** PSE **A2** shall meet the requirements of Clauses 4, 5, 6, 7 and 8, shall be tested as described in Clause 9 and shall meet the requirements of the tests.

#### **A2** 4.2 Power sources

4.2.1 The PSE shall have at least two power sources, a main power source and a standby power source.

4.2.2 The main power source shall be designed to operate from the public electricity supply or equivalent system.

4.2.3 At least one standby power source shall be a rechargeable battery.

4.2.4 The PSE shall include charging equipment to charge the battery and maintain it in a fully charged state.

4.2.5 Each power source, on its own, shall be capable of meeting the PSE manufacturer's output specification or, in the case of an integrated PSE, it shall be capable of operating the equipment in which it is integrated within its specifications.

4.2.6 When the main power source is available it shall be the exclusive source of power to the fire detection and fire alarm system, other than for currents associated with battery monitoring.

4.2.7 If the main power source fails, the PSE shall be automatically switched over to a standby power source. When the main power source is restored, the PSE shall be automatically switched back. **A2**

**4.2.8** If the PSE is integrated within other equipment of the fire detection and fire alarm system, the switching from one power source to the other shall not cause any change in status or indications other than those relating to the power supply.

**4.2.9** If the PSE is separated from other equipment of the fire detection and fire alarm system, and the switching from one power source to the other causes an interruption in supply of power, then the duration of the interruption shall be specified in the manufacturer's data.

**4.2.10** Failure of one of the power sources shall not cause the failure of any other power source or the failure of the supply of power to the system.

## **5 Functions**

### **5.1 Power supply from the main power source**

When operated from the main power source, the PSE:

- a) shall be capable of operating in accordance with its specification given in the manufacturer's data irrespective of the condition of the standby power source. This includes any charge condition of the battery, or open-circuit or short-circuit of the connection to the battery;
- b) shall be capable of continuously supplying  $I_{max}$  and simultaneously charging a battery which has been discharged to its final voltage;
- c) may allow battery charging to be limited or interrupted when the PSE is delivering a current greater than  $I_{max}$ .

### **5.2 Power supply from the standby power source (battery)**

**5.2.1** When operated from the standby power source, the PSE shall be capable of operating in accordance with the specification given in the manufacturer's data, irrespective of the condition of the main power source and with a high internal resistance of the battery and its associated circuitry, e.g. connections, fuses (see Annex A).

*Note deleted*

**5.2.2** The battery shall:

- a) be rechargeable;
- b) be suitable to be maintained in a fully charged state;
- c) be constructed for stationary use;
- d) be marked with its type designation and code or number identifying the production period.

If the battery is mounted in a cabinet which houses other fire detection and fire alarm equipment, it shall be of the sealed type and shall be mounted in accordance with the manufacturer's data.

**5.2.3** When operating from the standby power source the PSE shall have a facility to switch off the PSE output(s) if the output voltage(s) or the voltage of the battery falls below a value specified by the PSE manufacturer.

### **5.3 Charger**

**5.3.1** The charger shall be designed and rated so that:

- a) the battery can be charged automatically;
- b) a battery discharged to its final voltage can be recharged to at least 80 % of its rated capacity within 24 hours and to its rated capacity within another 48 hours;
- c) the charging characteristics are within the battery manufacturer's specifications for the range of battery temperatures reached with the ambient temperature (i.e. outside the standby power source enclosure) from  $-5\text{ }^{\circ}\text{C}$  to  $+40\text{ }^{\circ}\text{C}$ .

**5.3.2** Except for currents associated with battery monitoring, the battery shall not discharge through the charger when the charging voltage is below the battery voltage.



## 5.4 Faults

The PSE shall be capable of recognizing and signalling the following faults:

- a) loss of the main power source, within 30 minutes of the occurrence;
- b) loss of the standby power source, within 15 minutes of the occurrence;
- A2** c) a high internal resistance of the battery and its associated circuitry, e.g. connections, fuses within 4 h of the occurrence (see Annex A);
- d) loss of the battery charger, within 30 min of the occurrence, except where the charger is switched off or limited as under 5.1.c.

If the PSE is separately housed from the CIE, at least a fault output common to the above-mentioned faults shall be provided. This output signal shall also be given if the PSE is de-energized.

If the PSE is housed within the cabinet of the CIE, the above-mentioned faults shall be indicated in accordance with EN 54-2 either on the CIE or on the PSE itself. **A2**

## 6 Materials, design and manufacture

### 6.1 Manufacturer's declaration

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

- a) that 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 **A2** PSE **A2**;
- b) that the components of the **A2** PSE **A2** have been selected for the intended purpose and are expected to operate within their specification when the environmental conditions outside the cabinet of the p.s.e conform to class 3K5 of **A2** EN 60721-3-3:1995 **A2**.

### 6.2 Mechanical design

**A2** **6.2.1** The cabinet of the PSE shall be of robust construction, consistent with the method of installation recommended in the documentation. It shall meet at least classification IP 30 of EN 60529:1991.

**6.2.2** The PSE may be housed either in a separate cabinet or in cabinets associated with other fire detection and fire alarm system equipment.

**6.2.3** If the PSE is housed in the CIE, manual controls, fuses, calibration elements etc. for disconnection and adjustment of the power sources shall be accessible only at access level 3 of EN 54-2.

**6.2.4** If the PSE is not housed in the CIE, manual controls, fuses, calibration elements etc. for disconnection and adjustment of the power sources shall be accessible only by the use of a tool or key.

**6.2.5** All manual controls, fuses, calibration elements and cable terminals shall be clearly labelled (e.g. to indicate their function, rating or reference to appropriate drawings).

**6.2.6** If mandatory indicators required by EN 54-2 are repeated on a separately housed PSE, the indicators shall meet the requirements of EN 54-2.

### 6.3 Electrical design

All outputs shall have appropriate power limitation in order to ensure that in case of external short-circuits no danger exists because of heat production.

### 6.4 Power supply interface

If the PSE is designed to be used with a CIE (item B in Figure 1 of EN 541:1996) contained in a separate cabinet, then an interface shall be provided for at least two transmission paths to the CIE, such that a short circuit or interruption in one does not prevent the supply of power. **A2**

## 7 Documentation

### 7.1 User's documentation

**A2** The manufacturer shall prepare installation and user documentation, which shall be submitted to the testing authority together with the PSE. This shall comprise at least the following:

- a) a general description of the equipment;
- b) technical specifications of the inputs and outputs of the PSE, sufficient to permit an assessment of the mechanical and electrical compatibility with other components of the system (as described in EN 54-1) including:
  - 1) power requirements for recommended operation;
  - 2) the maximum and minimum electrical ratings for each input and output;
  - 3) information on the communication parameters employed by the transmission paths;
  - 4) fuse ratings;
  - 5) the types and the maximum and minimum capacities of the batteries suitable for use with the PSE;
  - 6) the maximum current drawn from the battery by the PSE when the main power source is disconnected;
  - 7) the maximum internal resistance of the battery and its associated circuitry,  $R_i$  max. (see Annex A);
  - 8)  $I_{min.}$ ,  $I_{max. a}$  and  $I_{max. b}$ ;
  - 9) recommended cable parameters for each transmission path. **A2**
- c) installation information, including:
  - 1) the suitability for use in various environments;
  - 2) mounting instructions;
  - 3) instructions for connecting inputs and outputs;
- d) commissioning instructions;
- e) operating instructions;
- f) maintenance information.

### 7.2 Design documentation

The manufacturer shall prepare design documentation, which shall be submitted to the testing authority together with the **A2** PSE **A2**. This documentation shall include drawings, parts lists, circuit diagrams, block diagrams and a functional description to such an extent that the compliance with the requirements of this European Standard can be checked and that a general assessment of the mechanical and electrical design is possible.

## 8 Marking

**A2** The PSE shall be clearly marked with the following information:

- a) the number of this European Standard (i.e. EN 54-4);
- b) the name or trademark of the manufacturer or supplier;
- c) the type number or other designation of the PSE;
- d) the code or number identifying the production period of the PSE.

If the PSE is housed in its own cabinet, at least a), b) and c) shall be marked on the outside of this cabinet.

If the PSE is integrated with other fire detection and fire alarm equipment in a common cabinet, then at least a) and b) shall be marked on the outside of the common cabinet. **A2**

## 9 Tests

### 9.1 General

#### 9.1.1 *Standard atmospheric conditions for testing*

Unless otherwise stated in a test method, 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 60068-1:1994 as follows:

temperature:	15 °C to 35 °C;
relative humidity:	25 % to 75 %;
air pressure:	86 kPa to 106 kPa.

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

#### 9.1.2 *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.

#### 9.1.3 *Electrical connection*

If the test procedure requires the specimen to be operating, then unless otherwise specified:

- it shall be connected to the mains and to a battery of an appropriate capacity for the test;
- the output(s) shall be loaded corresponding to I max. a;
- All inputs and outputs shall be connected to cables, equipment and/or dummy loads as specified by the manufacturer.

NOTE For integrated PSE the loading corresponding to I max. a is the condition of the equipment with maximum internal power dissipation and output loading that can be expected to occur continuously.

## 9.2 Functional tests

### 9.2.1 *General*

The functional tests are shown in Table 1.

Table 1 — Functional tests

Test	Mains supply voltage	Condition of battery	Loading condition	Duration of test
1	$V_n + 10\%$	Discharged <sup>b</sup>	I max. a	4 h
2	$V_n - 15\%$	Discharged <sup>b</sup>	I max. a	4 h
3	$V_n - 15\%$	Discharged <sup>b</sup>	I max. b	Manufacturer's specification with a minimum of 5 min
4	Disconnected	Discharging <sup>c</sup>	I max. b	
5	$V_n - 15\%$	Replaced by short circuit <sup>d</sup>	I max. a	
6	$V_n - 15\%$	Replaced by short circuit <sup>e</sup>	I max. a	
7	$V_n + 10\%$	Disconnected	I max. b	
8	$V_n - 15\%$	Disconnected	I max. b	
9	$V_n + 10\%$	Fully charged <sup>f</sup>	I min.	

<sup>a</sup>  $V_n$  is nominal voltage of the public electricity supply or equivalent.  
<sup>b</sup> A battery of max. specified capacity discharged to its final voltage as described in 9.3.1.1. The battery is allowed to charge during the test.  
<sup>c</sup> In this test the battery may be replaced by a laboratory power supply capable of supplying the required output current. The output voltage of the power supply shall be gradually reduced from the fully charged voltage of the battery to the voltage at which the PSE output(s) switch off as in 5.2.3.  
<sup>d</sup> Mains shall be applied after having replaced the battery by a short circuit.  
<sup>e</sup> Replace the battery by a short circuit after the mains is applied.  
<sup>f</sup> A battery charged to its fully charged voltage.

**9.2.1.1** For integrated PSE the loading corresponding to I max. b is the condition of the equipment with the maximum internal power dissipation and output loading that can be expected to occur while battery charging is not required.

**9.2.1.2** If the equivalent of I max. b is not specified by the manufacturer, the condition equivalent to I max. a shall be applied.

**9.2.1.3** For non-integrated PSE, I min. is the minimum output current specified by the manufacturer.

**9.2.1.4** For integrated PSE, the loading corresponding to I min. is the condition of the equipment with the minimum internal power dissipation and minimum output loading.

## **9.2.2 Full functional test**

### **9.2.2.1 Procedure for non-integrated PSE**

The test consists of all 9 tests with voltage combinations and output current as given in Table 1.

During tests 1 and 2 the output voltages of the PSE and the temperatures of the components with high power dissipation e.g. transformers, rectifiers and voltage regulators shall be measured and recorded.

If I max. b is not specified by the manufacturer, I max. a shall be applied.

During test 3 to 9 the output voltages shall be measured and recorded.

In addition during test 7 and 8 the ripple voltage shall be measured and recorded.

The ripple measurement shall include the switching frequency in the case of a switch mode technology PSE.

### **9.2.2.2 Requirements for non-integrated PSE**

In tests 1 up to 9 the output voltage shall remain within manufacturer's specification.

In tests 1 and 2 the surface temperatures of the components shall not exceed the maximum temperature given by the PSE manufacturer (6.1.b).

In tests 7 and 8 the ripple on the PSE output voltage shall not exceed the manufacturer's specification.

### **9.2.2.3 Procedure for integrated PSE**

The test consists of all 9 tests with the voltage combinations and condition equivalent to I max. a as in 9.1.3.b) and equivalent to I max. b as in 9.2.1.1.

Monitor the specimen during the tests to check that the functions of the equipment within which the PSE is integrated stay within manufacturer's specifications.

The temperature of the components with high power dissipation shall be measured and recorded.

During test 3 up to 9 monitor that the functions of the equipment within which the PSE is integrated stay within the specification.

### **9.2.2.4 Requirements for integrated PSE**

In test 1 up to 9 the functions of the equipment within which the PSE is integrated shall stay within the manufacturer's specification.

In tests 1 and 2 the surface temperature of the components shall not exceed the maximum temperature given by the PSE manufacturer.

## **9.2.3 Reduced functional test**

### **9.2.3.1 Procedure for non-integrated PSE**

The test consists of test 8 and test 9 as given in Table 1. The output voltages and test results shall be measured and recorded except in test 8 where the ripple voltage need not be measured.

### **9.2.3.2 Requirements for non-integrated PSE**

The output voltage(s) shall remain within the range specified by the PSE manufacturer.  $\overline{A_2}$

**A2** 9.2.3.3 *Procedure for the integrated PSE*

The test consists of tests 8 and 9 as given in Table 1. Monitor the specimen during the tests to check that functions of the equipment within which the PSE is integrated stay within specification.

**9.2.3.4 Requirement for integrated PSE**

The functions of the equipment within which the PSE is integrated shall stay within the manufacturer's specification.

*Text deleted* A2

**9.3 Test of the charger and the standby power source****9.3.1 Test procedure**

**9.3.1.1** A2 A battery of maximum capacity shall be used. A2 Discharge the battery to its final voltage at a discharge current of  $I_d = C/20$  amperes for lead acid type batteries, or  $I_d = C/10$  amperes for nickel cadmium type batteries, where  $C$  is the rated ampere hour capacity of the battery, given by the battery manufacturer. A1 For other battery types, the discharge current shall be that for which the battery manufacturer specifies the rated capacity. A1

**9.3.1.2** A2 Charge the battery for 72 h with the appropriate charger connected to the nominal mains ( $V_n$ ) while the PSE output is loaded by  $I_{max}$ . a. *Text deleted*

*Note deleted* A2

**9.3.1.3** Repeat the procedure as in 9.3.1.1 and measure the discharge time ( $T_1$ ) in hours.

**9.3.1.4** A2 Charge the battery again for 24 h at  $V_n - 15\%$  while the PSE output is loaded by  $I_{max}$ . a. *Text deleted*

*Note deleted* A2

**9.3.1.5** Discharge the battery again to its final voltage at a discharge current as in 9.3.1.1 and measure the discharge time ( $T_2$ ) in hours.

**9.3.2 Requirements**

The product of the discharge time  $T_1$  and the discharge current  $I_d$  shall be not less than the rated capacity of the battery ( $C$ ).

The product of the discharge time  $T_2$  and the discharge current  $I_d$  shall be not less than  $0,8 \times$  the rated capacity of the battery ( $C$ ).

**A2** 9.4 **Environmental tests****9.4.1 General**

One or more specimens may be supplied for environmental testing.

If the PSE is housed within other equipment for which there is a European Standard, e.g. EN 54-2 for the CIE, then the environmental tests in that standard shall be carried out. However, the functional test required by 9.4.2 and 9.4.3 of this standard shall be carried out in addition to the functional test of that standard.

If the PSE is housed separately from other equipment or housed within equipment for which there is no European Standard, then tests shown in Table 2 shall be applied. A2

A2

Table 2 — Environmental tests

Test	Operational or endurance	Clause number
Cold	Operational	9.5
Damp heat, steady state	Operational	9.6
Impact	Operational	9.7
Vibration, sinusoidal	Operational	9.8
Electromagnetic compatibility (EMC) immunity tests	Operational	9.9
Damp heat, steady state	Endurance	9.14
Vibration, sinusoidal	Endurance	9.15

#### 9.4.2 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. The full functional test (9.2.2) shall be carried out before and after the series of environmental tests. The reduced functional test (9.2.3) shall be carried out before, during (if specified) and after each environmental test.

The reduced functional test after one environmental test may be taken as the reduced functional test before the next environmental test.

#### 9.4.3 Tests for more than one specimens

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. The full functional test (9.2.2) shall be carried out on one specimen before the series of environmental tests and on each of the specimens after the last environmental test on that specimen.

The reduced functional test (9.2.3) shall be carried out before, during (if specified) and after each environmental test.

For each specimen, the reduced functional test after one environmental test may be taken as the reduced functional test before the next environmental test.

#### 9.4.4 Requirements

When subjected to the functional test, each specimen shall satisfy the relevant requirements in 9.2.2 or 9.2.3.

Any mechanical damage to the specimen observed following the tests 9.5 to 9.15 shall not jeopardise any mandatory function of this European Standard.

*Text deleted* A2

### 9.5 Cold (operational)

#### 9.5.1 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.

#### 9.5.2 Test procedure

##### 9.5.2.1 General

The test procedures with gradual changes in temperature described in A2 EN 60068-2-1:1993 A2 shall be used. Test Ad shall be used for heat-dissipating specimens (as defined in A2 EN 60068-2-1:1993 A2) and test Ab shall be used for non-heat-dissipating specimens.

##### 9.5.2.2 Initial examination

Before conditioning, subject the specimen to the functional test required by A2 9.4 A2.

##### 9.5.2.3 State of the specimen during conditioning

The specimen shall be mounted as required by 9.1.2, be connected as required by 9.1.3 and be operating.

**9.5.2.4 Conditioning**

Apply the following severity of conditioning:

- a) temperature:  $-5\text{ °C} \pm 3\text{ °C}$ ;
- b) duration: 16 h.

**9.5.2.5 Measurements during conditioning**

Monitor the specimen during the conditioning period to check that output voltages are within the specifications. During the last hour of the conditioning period, subject the specimen to the reduced functional test.

**9.5.2.6 Final measurements**

After the recovery period, subject the specimen to the functional test required by 9.4.5 and inspect it visually for mechanical damage both externally and internally.

**9.6 Damp heat, steady state (operational)****9.6.1 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.

**9.6.2 Test procedure****9.6.2.1 General**

The test procedure described in  $\text{A}_2$  EN 60068-2-78:2001  $\text{A}_2$  shall be used.

**9.6.2.2 Initial examination**

Before conditioning, subject the specimen to the functional test required by 9.4.5.

**9.6.2.3 State of the specimen during conditioning**

The specimen shall be mounted as required by 9.1.2, be connected as required by 9.1.3 and be operating.

**9.6.2.4 Conditioning**

Apply the following severity of conditioning:

- a) temperature:  $40\text{ °C} \pm 2\text{ °C}$ ;
- b) relative humidity:  $\left(93 \begin{smallmatrix} +2 \\ -3 \end{smallmatrix}\right)\%$ ;
- c) duration: 4 days.

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

**9.6.2.5 Measurements during conditioning**

Monitor the specimen during the conditioning period to check that output voltages are within the specifications. During the last hour of the conditioning period, subject the specimen to the reduced functional test.

**9.6.2.6 Final measurements**

After the recovery period, subject the specimen to the functional test required by 9.4.5 and inspect it visually for mechanical damage both externally and internally.

**9.7 Impact (operational)****9.7.1 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.

## 9.7.2 Test procedure

### 9.7.2.1 General

Apply the test apparatus and procedure described in  $\text{A}_2$  EN 60068-2-75:1997, Test Ehb  $\text{A}_2$ .

### 9.7.2.2 Initial examination

Before conditioning, subject the specimen to the functional test required by 9.4.5.

### 9.7.2.3 State of the specimen during conditioning

The specimen shall be mounted as required by 9.1.2, be connected as required by 9.1.3 and be operating.

### 9.7.2.4 Conditioning

Apply impacts to all surfaces of the specimen which are accessible without special tools.

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:

- a) impact energy:  $(0,5 \pm 0,04)$  J;
- b) number of impacts per point: 3.

### 9.7.2.5 Measurements during conditioning

Monitor the specimen during the conditioning periods to check that output voltages stay within the specifications and ensure that results of three blows do not influence subsequent series.

### 9.7.2.6 Final measurements

After the recovery period, subject the specimen to the functional test required by 9.4.5 and inspect it visually for mechanical damage both externally and internally.

## 9.8 Vibration, sinusoidal (operational)

### 9.8.1 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.

### 9.8.2 Test procedure

#### 9.8.2.1 General

The test procedure described in  $\text{A}_2$  EN 60068-2-6:1995  $\text{A}_2$  shall be used.

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.

#### 9.8.2.2 Initial examination

Before conditioning, subject the specimen to the functional test required by 9.4.5.

#### 9.8.2.3 State of the specimen during conditioning

The specimen shall be mounted as required by 9.1.2 and in accordance with  $\text{A}_2$  EN 60068-2-47:2005  $\text{A}_2$ , be connected as required by 9.1.3 and be operating.

#### 9.8.2.4 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:  $0,981 \text{ m} \cdot \text{s}^{-2}$  ( $0,1 \text{ g}_n$ );
- c) number of axes: 3;
- d) number of sweep cycles per axis: 1 for each functional condition.

#### 9.8.2.5 *Measurements during conditioning*

Monitor the specimen during the conditioning periods to check that output voltages stay within the specifications.

#### 9.8.2.6 *Final measurements*

After the recovery period, subject the specimen to the functional test required by 9.4.5 and inspect it visually for mechanical damage both externally and internally.

### **A<sub>2</sub>** 9.9 **Electromagnetic Compatibility (EMC), Immunity tests (operational)**

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

- a) mains voltage variations,
- b) mains supply voltage dips and interruptions,
- c) electrostatic discharge,
- d) radiated electromagnetic fields,
- e) conducted disturbances induced by electromagnetic fields,
- f) fast transient bursts;
- g) slow high energy voltage surges.

For these tests the criteria for compliance specified in EN 50130-4 and the following shall apply:

- 1) the functional test, called for before the initial and after the final measurements, shall be as required in 9.4;
- 2) the required operating condition shall be as described in 9.1.3,
- 3) 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,
- 4) in the electrostatic discharge test, the discharges shall be applied to parts of the equipment accessible for manual operations by authorised users. **A<sub>2</sub>**

#### 9.9.1 *Object of the test*

The object of the test is to demonstrate the immunity of the equipment to electrostatic discharges caused by personnel, who may have become electrostatically charged, touching the equipment or other equipment near by.

#### 9.9.2 *Test procedure*

##### 9.9.2.1 *General*

The test procedure for type tests performed in laboratories shall be used, as described in IEC 801-2:1991.

The tests consist of:

- a) direct electrostatic discharges onto parts of the equipment accessible to the operator (i.e. at access level 2, as specified in EN 52-2);
- b) indirect electrostatic discharges onto adjacent coupling planes.

##### 9.9.2.2 *Initial examination*

Before conditioning, subject the specimen to the functional test required by 9.4.5.

##### 9.9.2.3 *State of the specimen during conditioning*

The specimen shall be mounted as required by 9.1.2, be connected as required by 9.1.3 and be operating.

#### 9.9.2.4 Conditioning

Apply the following severity of conditioning:

- |  |   |
|--|---|
| a) test voltage:                       | 2 kV, 4 kV and 8 kV for air discharges at insulating surfaces;<br>2 kV, 4 kV and 6 kV for contact discharges to conducting surfaces and to coupling planes; |
| b) polarity:                           | positive and negative;  |
| c) number of discharges:               | 10 per pre-selected spot;   |
| d) time between successive discharges: | at least 1 s.   |

#### 9.9.2.5 Measurements during conditioning

Monitor the specimen during the conditioning period to check that output voltages stay within the specifications.

#### 9.9.2.6 Final measurements

After conditioning, subject the specimen to the functional test required by 9.4.5 and inspect it visually for mechanical damage both externally and internally.

**A2** 9.10 (deleted)

9.11 (deleted)

9.12 (deleted)

9.13 (deleted) **A2**

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

##### 9.14.1 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.).

##### 9.14.2 Test procedure

###### 9.14.2.1 General

Use the test procedure described in **A2** EN 60068-2-78:2001 **A2**.

###### 9.14.2.2 Initial examination

Before conditioning, subject the specimen to the functional test required by 9.4.5.

###### 9.14.2.3 State of the specimen during conditioning

The specimen shall be mounted as required by 9.1.2. The specimen shall not be supplied with power during the conditioning.

###### 9.14.2.4 Conditioning

Apply the following severity of conditioning:

- temperature:  $40\text{ °C} \pm 2\text{ °C}$ ;
- relative humidity:  $\left(93 \pm \frac{2}{3}\right)\%$ ;
- duration: 21 days.

Pre-condition the specimen at the conditioning temperature  $(40 \pm 2)\text{ °C}$  until temperature stability has been reached to prevent the formation of water droplets on the specimen.

###### 9.14.2.5 Final measurement

After conditioning, subject the specimen to the functional test required by 9.4.5 and inspect it visually for mechanical damage both externally and internally.

## 9.15 Vibration, sinusoidal (endurance)

### 9.15.1 *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.

### 9.15.2 *Test procedure*

#### 9.15.2.1 *General*

Use the test procedure described in [EN 60068-2-6:1995](#).

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.

#### 9.15.2.2 *Initial examination*

Before conditioning, subject the specimen to the functional test required by [9.4.5](#).

#### 9.15.2.3 *State of the specimen during conditioning*

The specimen shall be mounted as required by [9.1.2](#) and in accordance with [EN 60068-2-47:2005](#). The specimen shall not be supplied with power during the conditioning.

#### 9.15.2.4 *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:  $4,905 \text{ m} \cdot \text{s}^{-2}$  ( $0.5 \text{ g}_n$ );
- c) number of axes: 3;
- d) number of sweep cycles: 20 per axis.

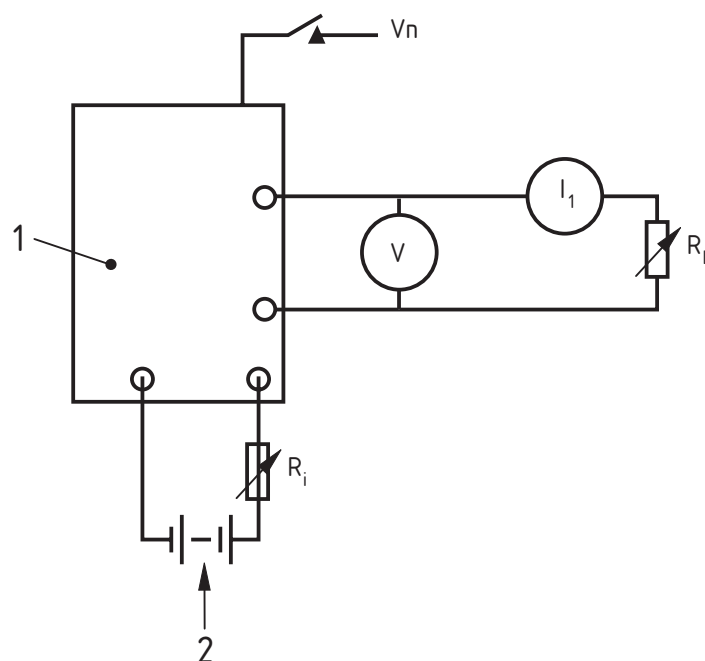
#### 9.15.2.5 *Final measurement*

After conditioning, subject the specimen to the functional test required by [9.4.5](#) and inspect it visually for mechanical damage both externally and internally.

## Annex A (normative)

### Laboratory procedure for testing compliance with the requirements of 5.2.1 and 5.4.c

#### A.1 Test procedure for non-integrated PSE



#### Key

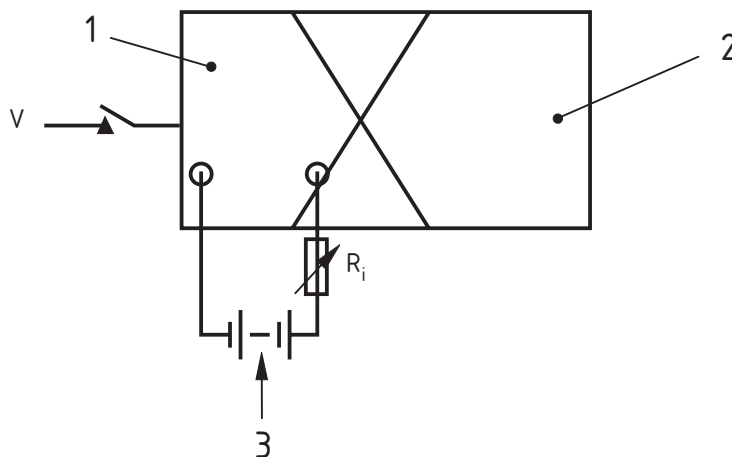
- 1 PSE
- 2 battery

Figure A.1 — Circuit arrangement for non-integrated PSE

- a) Connect the PSE as shown in Figure A.1 with:
  - 1) a fully charged battery of max. capacity,
  - 2) mains input of nominal voltage  $V_n$ ,
  - 3)  $R_i$  set to 0 Ohm,
  - 4) adjust  $R_L$  to give  $I_1 = I_{\min}$  (see 9.2.1.3),
- b) adjust  $R_i$  to specified  $R_{i \max}$ ,
- c) monitor the PSE for up to 4 h to detect a fault signal (a fault warning shall be indicated within 4 hours),
- d) disconnect the mains,
- e) adjust  $R_L$  to give  $I = I_{\max. b}$  (or  $I_{\max. a}$  if no  $I_{\max. b}$  is specified),
- f) measure the output voltage(s) for 2 min and check if they are within the specification.

NOTE  $R_{i \max}$  is specified by the PSE manufacturer for the purpose of the test. It is intended to simulate the maximum internal resistance of the battery and its associated circuitry, e.g. connections, fuses.  $\sqrt{A2}$

## A<sub>2</sub> A.2 Test procedure for integrated PSE



### Key

- 1 PSE
- 2 other equipment
- 3 battery

**Figure A.2 — Circuit arrangement for integrated PSE**

- a) Connect the PSE as shown in Figure A.2 with:
  - 1) a fully charged battery of max. capacity,
  - 2) mains input of nominal voltage  $V_n$ ,
  - 3)  $R_i$  set to 0 Ohm,
  - 4) put the equipment into the condition with minimum internal power dissipation and minimum output load (see 9.2.1.4),
- b) adjust  $R_i$  to the specified  $R_{i\ max}$ ,
- c) monitor the equipment for up to 4 h to detect a fault signal (a fault warning shall be indicated within 4 hours),
- d) disconnect the mains,
- e) put the equipment in the condition with the maximum internal power dissipation and maximum output load (equivalent to  $I_{\ max}$ . b or if not specified to  $I_{\ max}$ . a),
- f) monitor the equipment to check that the function(s) stay within the specification.

NOTE  $R_{i\ max}$  is specified by the PSE manufacturer for the purpose of the test. It is intended to simulate the maximum internal resistance of the battery and its associated circuitry, e.g. connections, fuses and to check that the fault warning is given with an internal resistance of the battery chosen by the manufacturer where the battery is still in the condition to operate the system. A<sub>2</sub>

**A<sub>2</sub> Annex ZA (informative)****Clauses of this European Standard addressing the provisions of the EU Construction Products Directives (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 power supply equipment intended for the use shown below and identifies the relevant clauses applicable.

Construction Product: Power supply 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 of power supply	4, 5, 6	None	a
Operational reliability	4, 5, 6, 7, 8		a
Durability of operational reliability temperature resistance	9.5		
Durability of operational reliability vibration resistance	9.7, 9.8, 9.15		
Durability of operational reliability electrical stability	9.9 to 9.13		
Durability of operational reliability humidity resistance	9.6, 9.14		
<p><sup>a</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.</p>			



## **A<sub>2</sub>** ZA.2 Procedures for the attestation of conformity of power supply 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: power supply 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. **A<sub>2</sub>**

**A2)** **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 4.2.1 a),
- 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. **A2)**



**A<sub>2</sub>** 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.

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. **A<sub>2</sub>**

**A2**) 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.

#### **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.

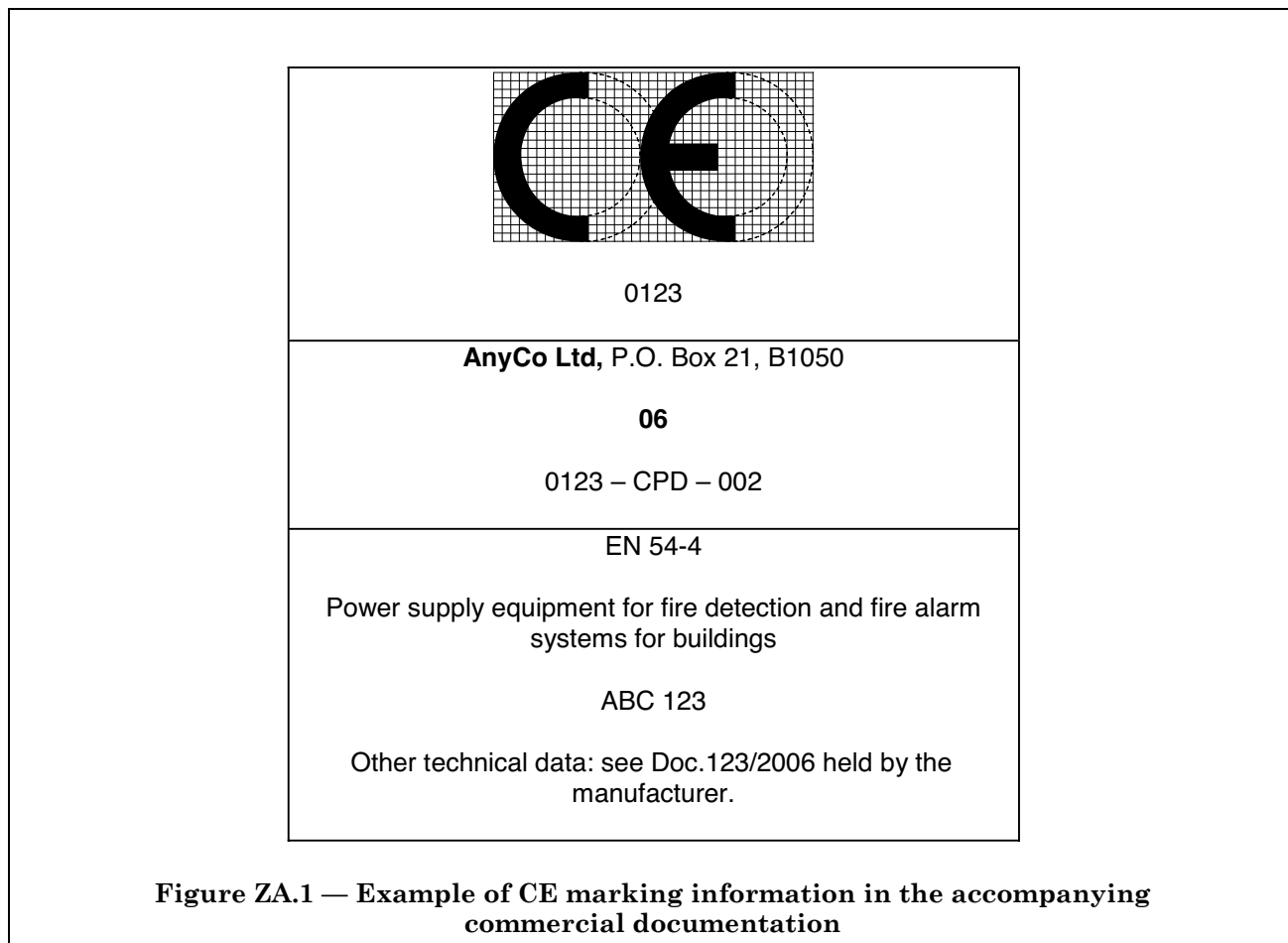
The CE marking symbol shall in addition be shown on the accompanying commercial documentation supplemented by:

- 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 54-4), its date and any amendments,
- 6) description of the construction product (i.e. Power supply equipment for fire detection and fire alarm systems for buildings),
- 7) type/model designation of the product,
- 8) other information required by **7.1** 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. **A2**)

<sup>A2)</sup> 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.



#### ZA.4 EC certification 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 authorized representative established in the EEA, and the place of production,

NOTE 1 The 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 2 Where 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. <sup>A2)</sup>

**A2)** 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. **A2)**

A1

## Bibliography

EN ISO 9001, *Quality management systems — Requirements (ISO 9001)*.

EU Directive 93/68/EC, *COUNCIL DIRECTIVE 93/68/EEC of 22 July 1993 amending Directives 87/404/EEC (simple pressure vessels), 88/378/EEC (safety of toys), 89/106/EEC (construction products), 89/336/EEC (electromagnetic compatibility), 89/392/EEC (machinery), 89/686/EEC (personal protective equipment), 90/384/EEC (non-automatic weighing instruments), 90/385/EEC (active implantable medicinal devices), 90/396/EEC (appliances burning gaseous fuels), 91/263/EEC (telecommunications terminal equipment), 92/42/EEC (new hot-water boilers fired with liquid or gaseous fuels) and 73/23/EEC (electrical equipment designed for use within certain voltage limits)*. A1

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