

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 Together with BS EN 54-2:1997, it supersedes BS 5839-4:1988 which is withdrawn.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

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

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 does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 24, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

This British Standard, having been prepared under the direction of the Health and Environment Sector Board, was published under the authority of the Standards Board and comes into effect on 15 March 1998

© BSI 2006

Amendments issued since publication

Amd. No.	Date	Comments
14596	27 August 2003	See national foreword
16676	31 October 2006	See national foreword

ISBN 0 580 29426 9

Descriptors: Fire equipment, fire detection systems, automatic equipment, safety devices, electric power supply, specifications, tests, inspection, testing conditions, marking

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.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, 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

© 1997 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

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.

Contents

	Page
Foreword	2
Introduction	4
1 Scope	4
2 Normative references	4
3 Definitions and abbreviations	5
3.1 Terms and definitions	5
3.2 Abbreviations	5
4 General requirements	5
4.1 Conformity	5
4.2 Power sources	5
5 Functions	6
5.1 Power supply from the main power source	6
5.2 Power supply from the standby power source (battery)	6
5.3 Charger	6
5.4 Faults	7
6 Materials, design and manufacture	7
6.1 Manufacturer's declaration	7
6.2 Mechanical design	7
6.3 Electrical design	7
6.4 Power supply interface	7
7 Documentation	8
7.1 User's documentation	8
7.2 Design documentation	8
8 Marking	8
9 Tests	9
9.1 General	9
9.2 Functional tests	9
9.3 Test of the charger and the standby power source	11
9.4 Environmental tests	12
9.5 Cold (operational)	13
9.6 Damp heat, steady state (operational)	13
9.7 Impact (operational)	14
9.8 Vibration, sinusoidal (operational)	14
9.9 Electromagnetic Compatibility (EMC), Immunity tests (operational)	15
9.10 (deleted)	16
9.11 (deleted)	16
9.12 (deleted)	16
9.13 (deleted)	16
9.14 Damp heat, steady state (endurance)	16
9.15 Vibration, sinusoidal (endurance)	17

Annexes

Annex A (normative) Laboratory procedure for testing compliance with the requirements of 5.2.1 and 5.4.c	18
Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Directives (89/106/EEC)	20
Bibliography	27

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**