

Loss Prevention Standard

LPS 1054: Issue 2.3

Requirements and testing procedures for the LPCB approval and listing of component compatibility for fire detection and alarm systems

This standard specifies the requirements for fire detection and alarm systems to determine the compatibility of the individual components with each other

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Issue 2.3	LOSS PREVENTION STANDARD	LPS 1054
Date Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of component compatibility for fire detection and alarm systems	Page 1 of 10

CONTENTS		PAGE
PARTICIPATING ORGANISATIONS		2
REVISION OF LOSS PREVENTION STANDARDS		3
FOREWORD		3
1	SCOPE	4
2	DEFINITIONS	4
3	ABBREVIATIONS	4
4	REQUIREMENTS	4
5	PUBLICATIONS REFERRED TO	8
APPENDIX A		9
Table of amendments Issued Since Publication		10

Issue 2.3	LOSS PREVENTION STANDARD	LPS 1054
Date Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of component compatibility for fire detection and alarm systems	Page 2 of 10

PARTICIPATING ORGANISATIONS

This standard was prepared by Expert Group A and approved by the LPC Fire and Security Board of BRE Global Ltd. The following organisations participated in the preparation of this standard:-

Association of British Insurers
 Association of Chief Police Officers
 Association for Specialist Fire Protection
 British Fire Protection Systems Association
 British Security Industry Association
 Chief & Assistant Chief Fire Officers Association
 Confederation of British Industry
 Door & Shutter Manufacturers Association
 Electrical Contractors Association
 Health & Safety Executive
 Office of the Deputy Prime Minister
 Risk Engineering Data Exchange Group
 Royal Institution of Chartered Surveyors

REVISION OF LOSS PREVENTION STANDARDS

Loss Prevention Standards will be revised by issue of revised editions or amendments. Details will be posted on our website at www.redbooklive.com

Technical or other changes which affect the requirements for the approval or certification of the product or service will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments. (See amendments table on page 10.)

The issue number will be given in decimal format with the integer part giving the issue number and the fractional part giving the number of amendments (e.g. Issue 3.2 indicates that the document is at Issue 3 with 2 amendments).

USERS OF LOSS PREVENTION STANDARDS SHOULD ENSURE THAT THEY POSSESS THE LATEST ISSUE AND ALL AMENDMENTS.

Issue 2.3	LOSS PREVENTION STANDARD	LPS 1054
Date Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of component compatibility for fire detection and alarm systems	Page 3 of 10

FOREWORD

This standard identifies the evaluation and testing practices for the LPCB certification and listing of products. LPCB Listing of life safety and security products for inclusion in the “Red Book” is based on the following

- i. Satisfactory product performance during testing and audit testing
- ii. Satisfactory product construction
- iii. Satisfactory manufacturing processes
- iv. Satisfactory product service experience.

NOTES

Compliance with this LPS does not of itself confer immunity from legal obligations. Users of LPSs should ensure that they possess the latest issue and all amendments.

LPCB welcomes comments of a technical or editorial nature and these should be addressed to “the Technical Director” at enquiries@breglobal.co.uk.

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Issue 2.3	LOSS PREVENTION STANDARD	LPS 1054
Date Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of component compatibility for fire detection and alarm systems	Page 4 of 10

1 SCOPE

Fire detection and alarm systems consist of various components. The prime objective of the system is to protect properties and lives. Therefore its function is to detect fire and/or smoke at an early stage and alert occupants of the building, who may be at risk, via audible and visible means. In certain cases signals are transmitted to a remote manned centre for notification.

This standard is aimed at ensuring that these components are compatible with each other. Because of the diversity of equipment / systems, the precise method of testing is not specified in this document. In some cases it may be necessary for the test method to be agreed between the certification body, test laboratory, and the applicant.

This standard specifies the requirements for fire detection and alarm systems to determine the compatibility of the individual components with each other. This applies to systems incorporating control and indicating equipment and power supply equipment complying with EN54-2 (Fire detection and fire alarm systems - Control and indicating equipment) and EN54-4 (Fire detection and fire alarm systems - Power supply equipment) respectively.

Note: It is anticipated that this standard will be brought in line with the requirements of EN54-13 (Fire detection and alarm systems - Specification for system requirements) once it is published.

2 DEFINITIONS

For the purposes of this standard, the definitions given in EN 54-1: 1996 (Fire detection and fire alarm systems - Introduction) apply.

3 ABBREVIATIONS

CIE - Control and Indicating Equipment
PSE - Power Supply Equipment
MCP – Manual Call Point
I/O modules – Input/output module

4 REQUIREMENTS

This standard is divided into 4 main sections. These include the compatibility of the following with the CIE:

- 4.1 Power supply(ies).
- 4.2 Detectors, manual call points and input/output modules.
- 4.3 Alarm devices (sounders etc)
- 4.4 Interface to other equipment/systems

These cover the compatibility of the above with the CIE.

Issue 2.3	LOSS PREVENTION STANDARD	LPS 1054
Date Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of component compatibility for fire detection and alarm systems	Page 5 of 10

4.1 Power Supply(ies)

- 4.1.1 The output voltage of the Power Supply Equipment (PSE) shall remain within the input voltage range of the CIE (and/or other equipment)⁽ⁱ⁾ for conditions 1 to 5 set out in Table 1 Annex 1 (Input Voltage Conditions).
- 4.1.2. Where Power Supply Equipment is contained in a separate cabinet ⁽ⁱⁱ⁾ from the CIE there shall be provision for two power transmission paths such that:
- 4.1.2.1 A failure⁽ⁱⁱⁱ⁾ in either one of these transmission paths shall not prevent the required power being transmitted to the CIE for its correct operation.
- 4.1.2.2 In the event of the fault in 4.1.2.1, the CIE shall indicate a fault as required by EN54-2 clause 8.2.4 ^[1], and a PSE fault as specified on EN54-4 clause 5.4^[2] by at least a fault indication common to the specified faults.
- 4.1.3 The maximum ripple voltage specification for the power supply shall not exceed that specified for the CIE (and/or other equipment)⁽ⁱ⁾ for the conditions 1 to 5 for table 1 Annex 1.
- 4.1.4 When the input supply changes from mains to battery and vice versa, the CIE (and/or other equipment)⁽ⁱ⁾ indication status or outputs shall not be affected, except those that are related to PSE faults.
- 4.1.5 In the event of a mains failure, the subsequent discharge of the battery to less than its minimum voltage shall not cause the operation of:-
- a) outputs to the fire alarm devices
 - b) outputs to the fire alarm routing equipment
 - c) outputs to the fire protection equipment unless the manufacturer specifies that these outputs operate under the failure of both power sources (e.g. output to door closers).

In addition these requirements shall be met when the mains supply is reconnected.

- (i) If PSE is connected to equipment other than the CIE (e.g. Beam detector), then this requirement shall apply for this other equipment.
- (ii) For this purpose the CIE and PSE can be considered to be in the same cabinet if they are adjacent to each other which means that they are mounted in physical contact with each other (See CEN Report draft August 2000^[4])
- (iii) In this case a failure includes open, short, partial open and short circuit faults.

4.2 Detectors, manual call points, and input/output modules ^(iv)

- 4.2.1. Signalling compatibility between CIE and detectors, MCPs, I/O modules and, where applicable, short circuit isolators.

Issue 2.3	LOSS PREVENTION STANDARD	LPS 1054
Date Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of component compatibility for fire detection and alarm systems	Page 6 of 10

All the following requirements shall be met under the following conditions

- a) maximum input voltage condition^(v), minimum line impedance and minimum circuit load
- b) minimum input voltage condition^(v), maximum line impedance and maximum circuit load

4.2.1.1 The CIE shall correctly indicate the quiescent and alarm conditions for detectors, MCPs, and I/O modules.

4.2.1.2 The failure of a remote indicator driven by the detectors, MCPs, or I/O modules, due to short or open circuit, shall not affect the correct signalling to the CIE, and shall not prevent the system from indicating an alarm in the event of fire.

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

4.2.1.4 Any single short, open, partially open, or partially short circuit fault shall not cause the loss of more than one fire zone. (Note: This can be met by providing a separate circuit for each fire zone or by separating fire zones with short circuit isolators.) Where short circuit isolators are used, the zones that are not affected by the fault shall not be prevented from giving an alarm signal for more than 100 seconds.

4.2.2 Detection circuit monitoring

All the following requirements shall be met under the following conditions.

- a) maximum input voltage condition^(v), minimum line impedance and minimum circuit load
- b) minimum input voltage condition^(v), maximum line impedance and maximum circuit load

4.2.2.2 The supply voltage at any point on the detection circuit shall fall within the specified voltage range of the detectors, MCPs, or I/O modules.

4.2.2.3 In the event of open or short circuit faults, a fault warning (see EN54-2 clause 8.2.4(a)) shall be given.

^(iv) This includes alarm devices and alarm device drivers that are connected to the same detection circuit.

^(v) See appendix 1.

4.2.2.3 As an option, monitoring of partial open and partial short circuit may be provided. In this case the following shall apply: In the event of partial open, or partial short circuit faults, a fault warning (see EN54-2 clause 8.2.4(a)) shall be given before the line conditions fall outside the manufacturer's specification for the device(s) under test.

Issue 2.3	LOSS PREVENTION STANDARD	LPS 1054
Date Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of component compatibility for fire detection and alarm systems	Page 7 of 10

4.2.2.4 The double addressing of detectors, MCPs, or I/O modules shall either result in an indication of a fault and/or it shall not affect the correct functioning of the device and the signalling to the CIE.

4.2.2.5 The CIE shall indicate a fault when a detector is disconnected from its base.

4.2.2.6 The connection of detectors, MCPs, or I/O modules with reversed polarities shall either indicate a fault or it shall not affect the correct operation of the device and the system.

4.2.3. Alarm response timing

All the following requirements shall be met under the following conditions.

- a) maximum input voltage condition^(v), minimum line impedance and minimum circuit load
- b) minimum input voltage condition^(v), maximum line impedance and maximum circuit load

The time taken for scanning and decision making in the event of fire shall fall within the requirements specified in EN 54-2 clauses 7.1.4 and 7.1.3.

4.2.4 Resetting

All the following requirements shall be met under the following conditions.

- a) maximum input voltage condition^(v), minimum line impedance and minimum circuit load
- b) minimum input voltage condition^(v), maximum line impedance and maximum circuit load

The resetting of the system shall be in accordance with the requirements stated in EN54-2, clause 7.6.1.

4.2.5 Others

It shall be verified that the maximum allowable line impedance conditions do not significantly change the analogue values returned by the detectors, MCPs, or I/O modules, i.e. such that the device remains within the manufacturer's specification.

4.3 Alarm Devices

All the following requirements shall be met under the following conditions.

- a) maximum input voltage condition^(v), minimum line impedance and minimum circuit load
- b) minimum input voltage condition^(v), maximum line impedance and maximum circuit load

Issue 2.3	LOSS PREVENTION STANDARD	LPS 1054
Date Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of component compatibility for fire detection and alarm systems	Page 8 of 10

- 4.3.1 The supply voltage at any point on the alarm circuit shall fall within the specified voltage range of the sounder device.
- 4.3.2 In the event of open or short circuit faults, a fault warning (see EN54-2 clause 8.2.5(a)) shall be given.
- 4.3.3 As an option, monitoring of partial open and partial short circuit may be provided. In this case the following shall apply: In the event of partial open or partial short circuit faults, a fault warning (see EN54-2 clause 8.2.5(a)) shall be given before the line conditions fall outside the manufacturer's specification for the device(s) under test.

4.4 Interface to other equipment/systems

All the following requirements shall be met under the following conditions

- a) maximum input voltage condition^(v), minimum line impedance and minimum circuit load
- b) minimum input voltage condition^(v), maximum line impedance and maximum circuit load

Each interface shall operate in accordance with manufacturer's specification.

5 PUBLICATIONS REFERRED TO:

EN 54-1 : 1996; Fire detection and fire alarm system; Part 1: Introduction.

EN 54-2 : 1998; Fire detection and fire alarm system; Part 2 : Control and indicating equipment

EN 54-4 : 1998; Fire detection and fire alarm system; Part 4 : Power supply equipment.

EN 54-13 Fire detection and alarm systems - Specification for system requirements – to be published.

CEN Report: Draft August 2000; EN54- Fire detection and fire alarm systems, Interpretation of specific clauses of EN54-2:1997 (Fire detection and fire alarm systems - Control and indicating equipment).

Issue 2.3	LOSS PREVENTION STANDARD	LPS 1054
Date Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of component compatibility for fire detection and alarm systems	Page 9 of 10

APPENDIX 1

The maximum and minimum input voltage conditions shall be determined using Table 1. The PSE used to determine these conditions shall be specified.

TABLE 1

Condition	Mains supply	Battery	Load
1	Nominal + 10 %	Fully charged	Minimum
2	Nominal + 10 %	Disconnected	Minimum
3	Nominal - 15 %	Terminal voltage of battery*	Maximum
4	Nominal - 15 %	Disconnected	Maximum
5	Disconnected	Terminal voltage of battery*	Maximum

* Terminal voltage of batteries the lowest workable voltage as defined by the manufacturer.

Issue 2.3	LOSS PREVENTION STANDARD	LPS 1054
Date Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of component compatibility for fire detection and alarm systems	Page 10 of 10

Amendments Issued Since Publication

DOCUMENT NO.	AMENDMENT DETAILS	SIGNATURE	DATE
LPS 1054-2.1	Reformatting to standard template	CJA	13/01/04
LPS 1054-2.2	Changes to copyright information	CJA	16/09/05
LPS 1054-2.3	<ol style="list-style-type: none"> 1. New front cover 2. Title added to header 3. Contents page moved to Page 1 4. Web address updated on Page 2 5. Notes added on Page 3 6. Repagination 7. Further change to copyright information 	DC	Jan. 2014