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Sistemi za odkrivanje in javljanje požara ter alarmiranje - 3. del: Naprave za alarmiranje - Zvočne naprave

Fire detection and fire alarm systems - Part 3: Fire alarm devices - Sounders

Brandmeldeanlagen - Teil 3: Feueralarmeinrichtungen Akustische Signalgeber

Systèmes de détection et d'alarme incendie - Partie 3: Dispositifs sonores d'alarme feu

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English Version

**Fire detection and fire alarm systems - Part 3: Fire alarm devices
- Sounders**

Systèmes de détection et d'alarme incendie - Partie 3:
Dispositifs sonores d'alarme feu

Brandmeldeanlagen - Teil 3: Feueralarmeinrichtungen
Akustische Signalgeber

This European Standard was approved by CEN on 8 May 2014.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 54-3:2014) has been prepared by Technical Committee CEN/TC 72 “Fire detection and fire alarm systems”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by January 2015, and conflicting national standards shall be withdrawn at the latest by April 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 54-3:2001.

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.

EN 54-3 has been revised so as to align with the second answer of CEN/TC 72 to Mandate M/109. EN 54-3 includes new clauses and annexes as follows:

- Requirements for software controlled devices (5.2.8);
- Clause 6 Assessment and verification of constancy of performance (AVCP);
- Clause 7 Classification and designation;
- Clause 8 Marking, labelling and packaging;
- Annex C Data supplied with sounders;
- Annex D (informative) Sound patterns used in some European countries;
- Annex E (informative) Comparison of flammability test requirements in various standards.

The previous Annex C dealt with the requirements and test methods for voice sounders. The content of this annex has been integrated in the main body of the standard, specifically under 4.3.3, 4.3.4, 4.3.5, 5.3.3, 5.3.4 and 5.3.5. In addition, Annex ZA has been revised to align with the Construction Products Regulation (CPR).

EN 54, *Fire detection and fire alarm systems*, consists of the following parts:

- *Part 1: Introduction*
- *Part 2: Control and indicating equipment*
- *Part 3: Fire alarm devices – Sounders*
- *Part 4: Power supply equipment*
- *Part 5: Heat detectors – Point detectors*
- *Part 7: Smoke detectors – Point detectors using scattered light, transmitted light or ionization*
- *Part 10: Flame detector – Point detectors*

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- *Part 11: Manual call points*
- *Part 12: Smoke detectors – Line detector using an optical light beam*
- *Part 13: Compatibility assessment of system components*
- *Part 14: Guidelines for planning, design, installation, commissioning, use and maintenance*
- *Part 15: Point detectors using a combination of detected phenomena*
- *Part 16: Voice alarm control and indicating equipment*
- *Part 17: Short circuit isolators*
- *Part 18: Input/output devices*
- *Part 20: Aspirating smoke detectors*
- *Part 21: Alarm transmission and fault warning routine equipment*
- *Part 22: Line-type heat detectors*
- *Part 23: Fire alarm devices – Visual alarms*
- *Part 24: Components of voice alarm systems – Loudspeakers*
- *Part 25: Components using radio links and system requirements*
- *Part 26: Carbon monoxide detectors – Point detectors*
- *Part 27: Duct smoke detectors*
- *Part 28: Non-resettable (digital) line type heat detectors*
- *Part 29: Multi-sensor fire detectors - Point detectors using a combination of smoke and heat sensors*
- *Part 30: Multi-sensor fire detectors - Point detectors using a combination of carbon monoxide and heat sensors*
- *Part 31: Multi-sensor detector – Point detectors using a combination of smoke, carbon monoxide and optionally heat sensors*
- *Part 32: Guidelines for the planning, design, installation, commissioning, use and maintenance of voice alarm systems*

NOTE This list includes standards that are in preparation and other standards may be added. For current status of published standards refer to www.cen.eu.

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

Introduction

The purpose of a fire alarm sounder is to warn person(s) within, or in the vicinity of, a building of the occurrence of a fire emergency situation in order to enable such a person(s) to take appropriate measures.

This European Standard recognizes that the exact nature of the sound requirements, i.e. its frequency range, temporal pattern and output level will vary according to the nature of the installation, the type of risk present and appropriate measures to be taken, the type of signals used by other non-emergency alarms (see, for example, EN ISO 7731) and national differences in custom and practice. The resulting standard specifies, therefore, a common method for the testing of the operational performance of sounders against the specification declared by the manufacturer rather than imposing common requirements.

In some European countries, specific frequencies of sound and sound patterns are used. These may be given in national codes or standards (see Annex D). Attention is drawn to national safety regulations which may specify maximum safe sound pressure level received by occupants of a building.

Attention is also drawn to ISO 8201:1987, *Acoustics – Audible emergency evacuation signal*, the international standard which specifies the temporal pattern and the required sound pressure level of an audible emergency evacuation signal.

This European Standard gives common requirements for sounders as well as for their performance under climatic, mechanical and electrical interference conditions which are likely to occur in the service environment. This European Standard covers sounders for either an indoor or an outdoor application environment category.

In fire detection and fire alarm systems, voice sounders are used as alarm devices for warning the occupants of a building of the occurrence of a fire risk, using a combination of an attention-drawing signal and dedicated voice message(s). The requirements, test methods and performance criteria specified in this standard for sounders are also applicable to voice sounders. Additional requirements, test methods and performance criteria specific to voice sounders are also incorporated.

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EN 54-3:2014 (E)**1 Scope**

This European Standard specifies the requirements, test methods and performance criteria for fire alarm sounders, including voice sounders, in a fixed installation intended to signal an audible warning between the fire detection and fire alarm systems and the occupants of a building (see EN 54-1:2011).

This European Standard provides for the assessment and verification of constancy of performance (AVCP) of fire alarm sounders to this EN.

This European Standard is not intended to cover:

- a) loudspeaker type devices primarily intended for emitting emergency voice messages that are generated from an external audio source;
- b) supervisory sounders, for example, within the control and indicating equipment.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 54-1:2011, *Fire detection and fire alarm systems - Part 1: Introduction*

EN 50130-4:2011, *Alarm systems - Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems*

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

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<https://standards.iteh.ai/catalog/standards/sist/365b271b-e68c-49c1-b66c->

EN 60068-2-1:2007, *Environmental testing - Part 2-1: Tests - Test A: Cold* (IEC 60068-2-1:2007)

EN 60068-2-2:2007, *Environmental testing - Part 2-2: Tests - Test B: Dry heat* (IEC 60068-2-2:2007)

EN 60068-2-6:2008, *Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)* (IEC 60068-2-6:2007)

EN 60068-2-27:2009, *Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock* (IEC 60068-2-27:2008)

EN 60068-2-30:2005, *Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)* (IEC 60068-2-30:2005)

EN 60068-2-42:2003, *Environmental testing - Part 2-42: Tests - Test Kc: Sulphur dioxide test for contacts and connections* (IEC 60068-2-42:2003)

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

EN 60068-2-78:2013, *Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state* (IEC 60068-2-78:2012)

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

EN 60529:1991/A1:2000, *Degrees of protection provided by enclosures (IP Code)* (IEC 60529:1989/A1:1999)

EN 60695-11-10:2013, *Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods* (IEC 60695-11-10:2013)

EN 60695-11-20:1999, *Fire hazard testing - Part 11-20: Test flames - 500 W flame test methods* (IEC 60695-11-20:1999)

EN 60695-11-20:1999/A1:2003, *Fire hazard testing - Part 11-20: Test flames - 500 W flame test methods* (IEC 60695-11-20:1999/A1:2003)

EN 61672-1:2003, *Electroacoustics - Sound level meters - Part 1: Specifications* (IEC 61672-1:2002)

3 Terms, definitions and abbreviations

For the purposes of this European Standard, the following terms, definitions and abbreviations and those given in EN 54-1 apply.

3.1 Definitions

3.1.1

A-weighted sound pressure level

L_{pA}

sound pressure level, expressed in dB(A), which is 20 times the logarithm to base ten of the ratio of the A-weighted sound pressure level to the reference pressure of 20 μ Pa at 1 kHz

Note 1 to entry: The A-weighting characteristics are given in EN 61672-1:2003.

3.1.2

delta sound pressure level

$\Delta(L_{pA})$

decrease in the mean A-weighted sound pressure level between measurements on the same specimen (Annex B)

Note 1 to entry: In this standard $\Delta(L_{pA})$ is used to compare the sound pressure level measured during environmental tests with that first measured on the same specimen during the reproducibility test.

3.1.3

equivalent sound pressure level

$L_{Aeq,T}$

the value of the sound pressure level, in dB(A), of continuous sound that, within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time

3.1.4

fire alarm sounder

sound generating device intended to signal an audible warning of fire between a fire detection and fire alarm system and the occupants of a building

3.1.5

maximum sound pressure level

$L_{AFmax,T}$

the maximum value of the sound pressure level, in dB(A), measured within a specified time interval, T and with a specified time weighting

Note 1 to entry: For application within the framework of this standard the time weighting Fast applies. Refer to EN 61672-1:2003.

EN 54-3:2014 (E)**3.1.6****mode (of operation)**

one of a possible number of pre-defined sounds (or sound outputs) of the sounder which can be selected by means specified by the manufacturer

EXAMPLE Sound patterns, sound pressure levels.

3.1.7**reference point**

point representing the origin of the sound within or on the surface of the sounder as specified by the manufacturer

Note 1 to entry: The reference point is used in Annex A.

3.1.8**sound pattern**

pre-defined acoustic alarm signal

Note 1 to entry: Sound pattern is also often referred to as tone.

3.1.9**supervisory sounder**

audible device on a piece of equipment used for drawing attention to a change of status

Note 1 to entry: Supervisory sounders are often mounted within the fire detection and fire alarm control and indicating equipment.

3.1.10**type A sounder**

device primarily intended for indoor applications [SIST EN 54-3:2014](https://standards.iteh.ai/catalog/standards/sist/365b271b-e68c-49c1-b66c-labc9d68d5/sist-en-54-3-2014)

Note 1 to entry: Type A sounders may be suitable for some protected outdoor situations.

3.1.11**type B sounder**

device primarily intended for outdoor applications

Note 1 to entry: Type B sounders may be more suitable than type A sounders for some indoor situations where high temperature and/or humidity are present.

3.1.12**volume control**

means for adjusting sound pressure level

3.2 Abbreviations

AC	Alternating current
AVCP	Assessment and verification of constancy of performance
CWFT	Classified without Further Testing
DC	Direct current
DoP	Declaration of performance
MS	Member states
NPD	No performance determined
RMS	Root mean square
SPL	Sound pressure level

4 Requirements

4.1 Compliance

In order to comply with this standard, sounders shall meet the requirements of this clause, which shall be verified by visual inspection or engineering assessment and shall be tested as described in Clause 5 and shall meet the requirements of the tests.

4.2 Operational reliability

4.2.1 Duration of operation

The sounder shall be rated for at least 100 h operation. No limitation by the manufacturer on duty factor or maximum on-time shall prevent the device from operating the 1 h 'on' / 1 h 'off' cycle required by the test procedure described in 5.2.1.

This requirement does not apply to the capacity of batteries which may be used within sounders as a means of local storage of operating power. The capacity and charging requirements of such batteries need to meet the requirement of the system.

4.2.2 Provision for external conductors

The sounder, unless it is a radio-linked component not using wires, shall provide space within its enclosure for external conductors to be brought in and terminated. Entry holes for conductors or cables shall be provided or the location where such holes are to be made shall be indicated, by providing a template or some other suitable means.

Terminals for connecting external conductors to the sounder shall be designed so that the conductors are clamped between metal surfaces without being damaged.

This requirement shall be assessed as specified in 5.2.2.

4.2.3 Flammability of materials

Plastic materials used in the construction of sounders shall comply with the following flammability requirements:

- a) EN 60695-11-10:2013 Class V-2 or HB75 for devices consuming less than or equal to 15 W of power;
- b) EN 60695-11-20:1999 and EN 60695-11-20:1999/A1:2003 Class 5VB for devices consuming more than 15 W of power.

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NOTE Annex E gives information on the test requirements and classification given in the European Standards and equivalent flammability ratings in UL 94.

This shall be assessed as specified in 5.2.3.

4.2.4 Enclosure protection

The degree of protection provided by the enclosure of the sounders shall meet the following requirements:

- a) Type A sounders: Code IP21C of EN 60529:1991 as amended by EN 60529:1991/A1:2000;
- b) Type B sounders: Code IP33C of EN 60529:1991 as amended by EN 60529:1991/A1:2000.

This shall be assessed as specified in 5.2.4 and meet the compliance criteria of 5.2.4.3.

4.2.5 Access

Means shall be provided to limit access for removal of parts or the whole device and to make adjustment to the mode of operation, e.g. special tool, codes, hidden screws, seals, etc.

NOTE The use of a special tool is intended to discourage unauthorised persons from easily accessing the equipment.

This requirement shall be assessed as specified in 5.2.5.

4.2.6 Manufacturer's adjustment

It shall not be possible to change the manufacturer's settings or to access the message recording function of voice sounders except by special means (e.g. the use of a special code or tool) or by breaking or removing a seal.

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This requirement shall be assessed as specified in 5.2.6.

4.2.7 On-site adjustment of the operation mode

If there is provision for on-site adjustment of the mode of operation of the sounder:

- a) For each setting, at which the manufacturer claims compliance with this standard, the sounder shall comply with 4.2.6.
- b) Any setting(s), at which the manufacturer does not claim compliance with this standard, shall comply with 4.2.6 and:
 - 1) for volume controls, the limits of the compliant range of sound pressure levels shall be clearly marked on the sounder and shown in the associated data,
 - 2) for sound pattern, the compliant setting(s) shall be clearly marked in the associated data.

These adjustments may be carried out at the sounder or at the control and indicating equipment.

This requirement shall be assessed as specified in 5.2.7.

4.2.8 Software controlled sounders

4.2.8.1 General

For sounders which rely on software control in order to fulfil the requirements of this standard, the requirements of 4.2.8.2, 4.2.8.3 and 4.2.8.4 shall be met.

4.2.8.2 Software documentation

4.2.8.2.1 The manufacturer shall submit documentation which gives an overview of the software design. This documentation shall be in sufficient detail for the design to be inspected for compliance with this standard and shall include at least the following:

- a) a functional description of the main program flow (e.g. as a flow diagram or structogram) including:
 - 1) a brief description of the modules and the functions that they perform;
 - 2) the way in which the modules interact,
 - 3) the overall hierarchy of the program,
 - 4) the way in which the software interacts with the hardware of the sounder,
 - 5) the way in which the modules are called, including any interrupt processing.
- b) a description of which areas of memory are used for the various purposes (e.g. the program, site specific data and running data);
- c) a designation, by which the software and its version can be uniquely identified.

4.2.8.2.2 The manufacturer shall have available detailed design documentation, which only needs to be provided if required by the testing authority. It shall comprise at least the following:

- a) an overview of the whole system configuration, including all software and hardware components;
- b) a description of each module of the program, containing at least:
 - 1) the name of the module,
 - 2) a description of the tasks performed,
 - 3) a description of the interfaces, including the type of data transfer, the valid data range and the checking for valid data.
- c) full source code listings, as hard copy or in machine-readable form (e.g. ASCII-code), including all global and local variables, constants and labels used, and sufficient comment for the program flow to be recognized;
- d) details of any software tools used in the design and implementation phase (e.g. CASE-tools, compilers).

4.2.8.3 Software design

In order to ensure the reliability of the sounder, the following requirements for the software design shall apply:

- a) the software shall have a modular structure;