SLOVENSKI STANDARD
SIST EN 54-25:2008

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Sistemi za odkrivanje in javljanje požara ter alarmiranje - 25. del: Sestavni deli za radijske povezave

Fire detection and fire alarm systems - Part 25: Components using radio links

Brandmeldeanlagen - Teil 25: Bestandteile, die Hochfrequenz-Verbindungen nutzen

Systèmes de détection et d'alarme incendie - Partie 25: Composants utilisant des liaisons radioélectriques

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Fire detection and fire alarm systems - Part 25: Components using radio links

Systèmes de détection et d'alarme incendie - Partie 25: Composants utilisant des liaisons radioélectriques

Brandmeldeanlagen - Teil 25: Bestandteile, die Hochfrequenz-Verbindungen nutzen

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Foreword

This document (EN 54-25:2008) 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of an identical text or by endorsement, at the latest by September 2008, and conflicting national standards shall be withdrawn at the latest by March 2011.

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 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 *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 ionisation*

— *Part 10: Flame detectors – Point detectors*

— *Part 11: Manual call points*

— *Part 12: Smoke detectors – Line detectors 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 fire 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 routing 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*

— *Part 26: Point fire detectors using carbon monoxide sensors*[1)]

— *Part 27: Duct smoke detectors*[1)]

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, 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 the United Kingdom.

1) Under preparation.

Introduction

The aim of this European Standard is to define additional requirements to other parts of EN 54 and tests that allow radio fire detection systems and components complying with them to be at least efficient and stable as wired fire detection systems and components complying with the current requirements of cable based systems in the EN 54 standards.

System and component aspects are dealt with in this European Standard because it is difficult to describe the components of a radio-linked system separately.

Capacity limitations with respect to the use of radio components may be specified in national technical rules or guidelines.

Technical aspects of the assessment of frequencies, bands and channels should be considered.

1 Scope

This European Standard specifies requirements, test methods and performance criteria for components used in fire alarms systems, installed in and around buildings, which use radio frequency links (RF links) to communicate. It also provides requirements for the evaluation of conformity of the components to the requirements of this European Standard.

Where components work together and this requires knowledge of the system design, this document also specifies requirements on the system.

When the fire detection and fire alarm systems (FDAS) use wired and RF links, the relevant parts of EN 54 apply together with this document. Requirements relevant to wire links are superseded or modified by those included in this European Standard.

This document does not restrict:

— the intended use of radio spectrum, e.g. frequency, power output of devices;

— the allowed maximum number of the components using RF links within the FDAS or one transmission path and/or RF link;

— the allowed maximum number of the components affected by loss of one transmission path and/or RF link.

These requirements relate to national regulations and can vary from member state to member state.

2 Normative references

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

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

EN 54-4, *Fire detection and fire alarm systems — Part 4: Power supply equipment*

EN 54-5, *Fire detection and fire alarm systems — Part 5: Heat detectors — Point detectors*

EN 54-11, *Fire detection and fire alarm systems — Part 11: Manual call points*

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

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

EN 60068-2-2, *Basic environmental testing procedures — Part 2-2: Tests — Tests B: Dry heat (IEC 60068-2-2:1974 + IEC 60068-2-2A:1976)*

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

EN 60068-2-27, *Basic environmental testing procedures — Part 2: Tests — Test Ea and guidance: Shock (IEC 60068-2-27:1987)*

EN 60068-2-30, *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, *Environmental testing — Part 2-42: Test methods — Test Kc: Sulphur dioxide test for contacts and connections (IEC 60068-2-42:2003)*

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

EN 300113-1 V 1.4.1:2002, *Electromagnetic compatibility and Radio spectrum Matters (ERM) — Land mobile service — Radio equipment intended for the transmission of data (and/or speech) using constant or non-constant envelope modulation and having an antenna connector — Part 1: Technical characteristics and methods of measurement*

EN 300220-1 V 1.3.1:2000, *Electromagnetic compatibility and Radio spectrum Matters (ERM) — Short range devices — Radio equipment to be used in the 25 MHz to 1000 MHz frequency range with power levels ranging up to 500 mW — Part 1: Technical characteristics and test methods*

EN ISO 9001, *Quality management systems — Requirements (ISO 9001:2000)*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in the relevant part of EN 54 and the following apply.

3.1.1
antenna
element of a radio component of the fire detection and fire alarm system (FDAS) that allows coupling between the component and the media where radio frequency (RF) waves are propagated

3.1.2
assigned band
frequency band within which the equipment is authorised to operate

3.1.3
site attenuation
degradation of the RF signal due to either path loss or a change in the environment of the FDAS after its installation

NOTE Site attenuation can be changed by e.g. installation or relocation of reflection or absorption materials.

3.1.4
autonomous power source
independent power supply equipment (i.e. without any link with the public power supply or an equivalent system) not rechargeable during operation and able by itself to allow the supplied component to run

NOTE An autonomous power source is e.g. a primary battery.

3.1.5
base station
transceiver in the system which communicates with a certain number of components

3.1.6
collision
simultaneous transmissions, from two or more transmitters belonging to the same system, of sufficient signal strength to cause, by mutual interaction, corruption or obliteration of the information carried by the RF signals

3.1.7
compatibility
capacity of a component of the system to operate with another component of this system, in the limits specified by the manufacturer and by the applicable product standard if this standard exists and in specified configurations of the system

3.1.8
fire detection and fire alarm system
FDAS
group of components including a CIE which, when arranged in (a) specified configuration(s), is capable of detecting and indicating a fire, and giving signals for appropriate action

[EN 54-13:2005, definition 3.1.7]

3.1.9
identification code
part of a message used to identify a transmitting RF communication device belonging to the system

3.1.10
intermediate element
device connected to a transmission path of a fire detection and fire alarm system, used to receive and/or transmit signals necessary for the operation of the fire detection and fire alarm system

NOTE An intermediate element meets the requirements of an input/output device in accordance with EN 54-18 but it is not restricted to electrical signals.

3.1.11
manufacturer
natural or legal person, who places the product on the market under his own name

NOTE Normally, the manufacturer designs and manufactures the product himself. A manufacturer can also design, manufacture, assemble, pack, process or label the product as subcontractor or he assembles, packs, processes, or labels products as ready-made products.

3.1.12
radio frequency link
RF link
means of communication between at least two points, using RF wave propagation

NOTE The RF link is the equivalent to the transmission path as defined in other parts of EN 54.

3.1.13
radio part
component or part of the component incorporating the receiver and/or transmitter

NOTE The radio part can include a power supply, e.g. an autonomous power source.

3.1.14
receiver
device which receives the RF energy corresponding to a RF link

NOTE The receiver can be incorporated in a component of the FDAS.

3.1.15
RF interference
RF transmission from any other source other than any component of the FDAS that may cause corruption or obliteration of wanted signals and not conforming to the definition of collision or message substitution

3.1.16
service life
period of useful life of an autonomous power source under specified conditions

3.1.17
special tool
device not normally carried by the public (e.g. a key), normally provided by the manufacturer and which is used for opening the enclosure of the component to detach the antenna

NOTE It is intended to deter unauthorised access to the antenna, while being available on site either at a defined location or from a "responsible person" familiar with and having knowledge of the system.

3.1.18
transmitter
device which generates the RF energy necessary for a RF link

NOTE The transmitter can be incorporated in a component of the FDAS.

3.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

CIE Control and indicating equipment

FDAS Fire detection and fire alarm systems

PSE Power supply equipment

RF Radio frequency

4 System requirements

4.1 General

The requirements of this document shall be applied, together with requirements of the relevant part of EN 54, where the radio-linked component has the same function as the component covered by that part and when not otherwise specified in this European Standard.

For example, an RF linked component having the function of a heat detector shall comply with EN 54-5 and a component having the function of a manual call point shall comply with EN 54-11.

4.2 Radio frequency links

4.2.1 Immunity to site attenuation

The manufacturer shall provide means either in the component itself or by the system configuration to ensure that a site attenuation, which may be caused by influences for different reasons on site, may not affect the RF link adversely in a way that communication between components is not possible. This reserve of site attenuation shall be specified as follows:

a) at least 10 dB up to frequencies of 10 MHz;

b) for frequencies of > 10 MHz as calculated in Annex B.

The manufacturer shall provide the necessary documentation and/or means for the assessment which permits the full functionality of the component to be assessed. If these means are a part of the component, the user shall not be able to interfere with these means.

The test includes verification by an assessment and shall be carried out in accordance with 8.2.2.

4.2.2 Alarm signal integrity

The components of the system shall use a transmission protocol on the transmission path and/or the RF link to ensure that no alarm message is lost.

The test shall be carried out in accordance with 8.2.3.

4.2.3 Identification of the RF linked component

4.2.3.1 Each RF linked component shall be identified by an individual identification code as belonging to one specific FDAS.

4.2.3.2 The manufacturer shall provide means to ensure that a RF linked component shall not be accepted by other FDAS.

The test shall be carried out in accordance with 8.2.4.

4.2.3.3 The manufacturer shall provide the necessary documentation and/or means for the assessment of this requirement.

4.2.4 Receiver performance

The receiver shall meet the requirements given in Table 1.

Table 1 — Minimum receiver performance characteristics

Characteristics	Limit	Frequency offset from the working frequency	Notes
Adjacent channel selectivity	≥ 35 dB	—	For all band widths and modulation schemes
Blocking or desensitization	≥ 40 dB	± 1 MHz	In direct sequence spread spectrum systems (DSSS) the working frequency is the centre frequency
	≥ 45 dB	± 2 MHz	
	≥ 60 dB	± 5 MHz	
	≥ 65 dB	± 10 MHz	
Spurious response rejection	≥ 40 dB	—	—

The manufacturer of the receiver shall provide a test report by a test laboratory to demonstrate that the requirements of this clause are fulfilled. If the manufacturer cannot provide this evidence, the tests described in 8.2.5 shall be carried out. The manufacturer shall provide the means to carry out the test, e.g. stop frequency hopping.

4.2.5 Immunity to interference

4.2.5.1 General

The following kind of interferences on the RF link shall be covered:

a) radio influences from own system;

b) radio influences from other users of the spectrum.

The following influences are not covered:

c) random influences as a result of electromagnetic effects, because these are covered by EMC guidelines (see EN 50130-4);

d) deliberate attacks on the radio controlled transmission paths with the help of electromagnetic effects (sabotage via the radio controlled route), because no special sabotage resistance is required for fire alarm systems in the parts of EN 54.

4.2.5.2 Availability of RF link in two or more technically similar systems coming from the same manufacturer

In the case of two or more technically similar systems coming from the same manufacturer operating within the radio range it shall be ensured that the RF links do not mutually impede one another.

The manufacturer shall specify the means. The means shall be suitable to ensure the availability of all parts of the system in all expected system configurations.

The test shall be carried out in accordance with 8.2.6.

4.2.5.3 Availability of the RF link in the presence of other band users

The manufacturer shall take measures to ensure that signal transmission is possible even if other users are working in the same band.

These measures shall ensure that an external user who uses the maximum permitted limits in the assigned band or sub-band, such as bandwidth and duty cycle, does not cause interference.

NOTE The definition in EN 300220-1 V 1.3.1:2000 applies for establishing the duty cycle.

The test shall be carried out in accordance with 8.2.7.

4.2.5.4 Integrity of the RF link

The application of one of the interfering RF signals defined in 8.2.7 to one of the FDAS receivers shall cause neither an alarm condition nor a fault warning condition at the CIE.

4.2.6 Loss of communication

The loss of the ability of the system to transmit a message of any RF linked component to the CIE within in EN 54-2 defined periods shall be recognized in less than 300 s and shall be indicated in less than 100 s.

The test shall be carried out in accordance with 8.2.8.

4.2.7 Antenna

The antenna or its cable shall only be detachable by opening the enclosure of the component or by using special tools provided by the manufacturer.

The test shall be carried out in accordance with 8.2.9.

5 Components requirements

5.1 Compliance

In order to comply with this standard the components shall meet the requirements of this clause which shall be verified by visual inspection or engineering assessment, shall be tested as described in Clause 8 and shall meet the requirements of the tests.

5.2 General

5.2.1 All components shall meet the requirements of the relevant part of EN 54 and the following additional specific requirements, including the transmission paths and/or radio links.

5.2.2 The component shall be designed that the removal from its base and/or point of installation are detected and indicated as a fault.

5.2.3 Components that rely on software control in order to fulfil the requirements of this specification shall comply with the relevant part of EN 54.

5.3 Power supply equipment

5.3.1 The components shall be powered by:

a) an autonomous power source, e.g. a primary battery, or

b) a power supply equipment in accordance with EN 54-4.

NOTE In accordance with EN 54-2 a CIE is powered with power supply equipment complying with EN 54-4.

5.3.2 All components powered by an autonomous power source shall comply with the following requirements:

a) the autonomous power source shall be within the enclosure of the component;

b) the autonomous power source shall allow normal operation of the component for a minimum period of 36 months.

The manufacturer shall declare the type of the autonomous power source and its service life for the component in normal operation. The service life shall be demonstrated by a statement of calculation. This calculation shall take into account the mean consumption and voltage under quiescent and at standard atmospheric conditions. The product of the specified discharge time of 36 months and the mean discharge current shall not be greater than 85 % of the rated capacity of the power source.

NOTE The remaining 15 % of the rated capacity takes into account of self discharge of the power source.

The mean consumption shall be calculated based on the electronic element of the circuit.

Where calculation is not practical, the mean consumption shall be measured at nominal voltage for at least 1 h under quiescent operation after the stabilisation period given by the manufacturer.