



SLOVENSKI STANDARD

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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

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

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

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 72.

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Foreword

This document (prEN 54-25:2015) has been prepared by Technical Committee CEN/TC 72 "Fire detection and fire alarm systems", the secretariat of which is held by BSI.

This document is currently submitted to the Enquiry.

This document will supersede EN 54-25:2008.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports the basic requirements of Regulation (EU) 305/2011.

For relationship with EU Regulation (EU) 305/2011, see informative Annex ZA which is an integral part of this document.

EN 54-25 has been revised to align with the Construction Products Regulation (CPR). It includes new and revised clauses and annexes as follows:

- Clause 4, Requirements;
- Clause 5, Testing, assessment and sampling methods;
- Clause 6, Assessment and verification of consistency of performance (AVCP);
- Clause 7, Classification and designation;
- Clause 8, Marking labelling and packaging;
- Annex A, Test configuration by using radio frequency shielded test equipment updated new technical aspects updated;
- Annex B, Functionality Matrix Guidance added;
- Annex C, Tests for radio systems;
- Annex D, Data and calculation of the service life of the autonomous power source(s);
- Annex ZA has been revised to align with the Construction Products Regulation (CPR).

The main technical changes are as follow:

- RF-receiver parameters referenced to ETSI standards;
- Single channel systems not allowed;
- Addition of output devices.

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;*

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- *Part 5: Heat detectors — Point detectors;*
- *Part 7: Smoke detectors — Point detectors using scattered light, transmitted light or ionization;*
- *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 [CEN Technical Specification];*
- *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: Resettable line-type heat detectors [currently at acceptance stage];*
- *Part 23: Fire alarm devices — Visual alarms devices;*
- *Part 24: Components of voice alarm systems — Loudspeakers;*
- *Part 25: Components using radio links [the present document; currently at Enquiry stage];*
- *Part 26: Carbon monoxide detectors — Point detectors*
- *Part 27: Duct smoke detectors;*
- *Part 28: Non-resettable line type heat detectors [currently at voting stage];*
- *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 fire detectors — Point detectors using a combination of smoke, carbon monoxide and optionally heat sensors;*
- *Part 32: Planning, design, installation, commissioning, use and maintenance of voice alarm systems [CEN Technical Specification].*

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.

Introduction

The aim of this draft 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 as 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 draft 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.

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1 Scope

This draft European Standard specifies requirements, test methods and performance criteria for components used in fire alarms systems, installed in and around buildings (either permanently or temporarily), 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 draft European Standard.

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

This draft European Standard provides for the assessment and verification of constancy of performance (AVCP) of components using radio links to this EN.

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 draft European Standard.

This draft European Standard 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;
- the allowed maximum number of the components affected by loss of one transmission path.

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

2 Normative references

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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 (all parts), *Fire detection and fire alarm systems*

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 50130-5:2011, *Alarm systems — Part 5: Environmental test methods*

EN 60068-1:1994, *Environmental testing — Part 1: General and guidance (IEC 60068-1:1988)*

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

EN 300 220 (all parts), *Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW*

3 Terms, definitions and abbreviations

3.1 Terms and definition

For the purposes of this document, the terms, definitions and abbreviations 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 authorized to operate

3.1.3

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 1 to entry: An autonomous power source is e.g. a primary battery.

3.1.4

base station

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

3.1.5

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

3.1.6

commissioning attenuation

maximum attenuation between the components (not taking into account the attenuation reserve) at which commissioning is still possible and permitted

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

identification code

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

prEN 54-25:2015 (E)**3.1.9****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 1 to entry: 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.

3.1.10**manufacturer**

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

Note 1 to entry: 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.

3.1.11**quiescent state**

normal operation condition other than fire alarm condition, fault condition, disabled condition, and test condition

3.1.12**radio cell**

set of components using radio links that share a common base station

3.1.13**radio part**

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

Note 1 to entry: 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 1 to entry: The receiver can be incorporated in a component of the FDAS.

3.1.15**reference level**

signal level at which messages are received reliably

Note 1 to entry: The reference level is used as a basic level for other radio tests.

3.1.16**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

3.1.17**RF transmission path****RF Link**

direct radio interconnection between two wireless components regardless the number of operational frequencies within one assigned band

3.1.18**service life**

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

3.1.19**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 1 to entry: Site attenuation can be changed by e.g. installation or relocation of reflection or absorption materials.

3.1.20**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 1 to entry: It is intended to deter unauthorized 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.

3.1.21**transmitter**

device which generates the RF energy necessary for a RF link

Note 1 to entry: The transmitter can be incorporated in a component of the FDAS.

3.1.22**threshold**

attenuation value (dB) at which 80 % of transmission messages are received reliably

3.1.23**useful signal**

data element that is communicated point to point between wireless components or parts of wireless systems representing the normal operational characteristics of the tested device

EXAMPLE Examples for useful signals are alarm, fault, supervisory or command messages.

3.2 Abbreviations

CIE	Control and indicating equipment
EMC	Electromagnetic compatibility
FDAS	Fire detection and fire alarm systems
PSE	Power supply equipment
RF	Radio frequency
RL	Reference level

4 Product characteristics**4.1 General****4.1.1 General**

In order to comply with this standard, components using radio links 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 test requirements of the tests.

The requirements of this draft European Standard 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 draft European Standard.

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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.

For systems using frequencies in the range from 25 MHz to 1 GHz the requirements of EN 300 220 (all parts) shall be fulfilled.

4.1.2 Documentation

The manufacturer shall prepare relevant detailed documentation to provide a specification of the system in order to evaluate FDAS wireless components with this standard.

This documentation shall include the following:

- a detailed description of the system architecture (text and graphical);
- a list of the relevant components of the fire detection and fire alarm system with description of the maximum numbers of supported components on each base station (e.g. CIE or gateway);
- description of power sources (autonomous or external) or in the case of autonomous power source this shall include the type and numbers of batteries, and associated electronic circuit operational characteristics;
- hardware and software details of each component;
- alternative modes of configuration or operation;
- operational frequency list and frequency bands;
- topology of the system (e.g. Mesh-system, Star-system);
- auto gain control or transmitter power level adjustment;
- details of commissioning/installation procedures;
- description of any communication protocols and latency times;
- carrier wave modulation techniques;
- details about frequency hopping;
- RF transmitter and receiver circuitry and Antenna characteristics;
- test reports to demonstrate the conformity of the components with the Construction Products Regulations (CPR), to the relevant part(s) of the EN 54 series;
- test reports to demonstrate conformity with other directives (e.g. Radio equipment directive (RED), Low voltage directive (LVD), Electromagnetic compatibility directive (EMC, directive)).

NOTE Additional information may be required by the certification body to access the FDAS component with this draft European Standard.

4.2 Response delay (response time)**4.2.1 Delay of alarm message**

The components of the system shall use a transmission protocol to ensure that no alarm message is lost.

An alarm message shall be delivered to the base station within 10 s.

If multiple alarm messages are generated simultaneously, the first shall be delivered to the base station within 10 s, the last within 100 s.

4.2.2 Activation of outputs

The components of the system shall use the transmission protocol to ensure that every activation message is reliably delivered to the intended component. An output activation command shall be delivered to the intended components within at most 10 s after the output activation command is received by the base station. If an output activation command shall be delivered to multiple components, the last component shall receive it within at most 100 s after the activation command is received by the base station. If the respective product regulation requires the synchronization of outputs, synchronization shall be established before the activation of the outputs.

4.3 Operational reliability

4.3.1 Detection of removal

This clause is only applicable to devices where the position is essential for the intended function of the device e.g. point detectors, manual call points, sounders, beacons.

Non-destructive removal of the device from its position (e.g. wall, ceiling) shall be detected and indicated as a fault.

If the device consists of separable parts for the communication and/or for the function, the removal of any of these parts from the device shall be detected and indicated fault.

4.3.2 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 30 dB.

This reserve of site attenuation can be reduced by 15 dB with the use of at least one of the following methods to increase the reliability of the RF link:

- automatic alteration of the directional radiation characteristics of the transmitter or receiver antenna;
- frequency diversity, ability to change carrier frequency by at least 1 MHz (frequency hop to next carrier frequency);
- space diversity, the distance separation between one or more antennae (normally with similar characteristics) of at least one wavelength;
- pattern diversity with two or more co-located antennas with different radiation patterns (no more than 6 dB difference), together able to cover a larger portion of angle space;
- polarization diversity, pairs of antennas with orthogonal polarizations;
- multipath transmission, the target point of the useful signal (e.g. CIE, base station, other radio component) can be reached automatically via several independent radio paths (radio component with at least two independent transmission paths).

The manufacturer shall provide the necessary documentation and equipment for the assessment which permits the full functionality of the component to be assessed.

The requirements are verified by a documentation assessment and test accordance with 5.3.2.