SLOVENSKI STANDARD
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Sistemi za odkrivanje in javljanje požara ter alarmiranje - 5. del: Toplotni javljalniki - Točkovni javljalniki

Fire detection and fire alarm systems - Part 5: Heat detectors - Point detectors

Brandmeldeanlagen - Teil 5: Wärmemelder - Punktförmige Melder

Systèmes de détection et d'alarme incendie - Partie 5: Détecteurs de chaleur - Détecteurs ponctuels

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Fire detection and fire alarm systems - Part 5: Heat detectors - Point detectors

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

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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Contents

Page

Foreword

This document (prEN 54-5:2011) 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 CEN Enquiry.

This document will supersede EN 54-5:2000.

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, 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 ionization

— Part 10: Flame detector – Point detectors

— 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.

1 Scope

This European Standard specifies the requirements, test methods and performance criteria for point heat detectors for use in fire detection and fire alarm systems for buildings (see EN 54-1:1996).

For other types of heat detector, or for detectors intended for use in other environments, this standard should only be used for guidance. Heat detectors with special characteristics and developed for specific risks are not covered by this standard.

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.

ISO/IEC Publication	Year	Title	EN/HD	Year
-	-	Fire detection and fire alarm systems - Part 1: Introduction.	EN 54-1	1996
-	-	Alarm Systems – Part 4: Electromagnetic compatibility. EN 50130-4: - product family standard: Immunity requirements for components of fire, intruder and social alarm systems	EN 50130-4	2003
IEC 60068-1	1988	Environmental testing - Part 1: General and guidance, + A1:1992.	EN 60068-1	1994
IEC 60068-2-1	1990	Environmental testing - Part 2: Tests - Tests A: Cold, + A1:1993, A2:1994.	EN 60068-2-1	1993
IEC 60068-2-2	1974	Basic Environmental testing procedures - Part 2: Tests - Tests B: Dry heat, + Supp. A:1976, A1:1993, A2:1994.	EN 60068-2-2	1993
IEC 60068-2-3	1969	Basic Environmental testing procedures - Part 2: Tests - Test Ca: Damp heat, steady state, + A1:1984.	HD 323.2.3 S2	1987
IEC 60068-2-6	1995	Environmental testing – Part 2: Tests - Test Fc: Vibration, sinusoidal, + Corr.:1995	EN 60068-2-6	1995
IEC 60068-2-27	1987	Basic Environmental testing procedures - Part 2: Tests - Test Ea & Guidance: Shock.	EN 60068-2-27	1993

IEC 60068-2-30	1980	Basic Environmental testing procedures - Part 2: Tests - Test Db & Guidance: Damp heat, cyclic (12 + 12 hour cycle), + A1:1985.	HD 323.2.30 S3	1988
IEC 60068-2-42	1982	Basic Environmental testing procedures - Part 2: Tests - Test Kc: Sulphur dioxide test for contacts and connections.	-	-
IEC 60068-2-56	1988	Environmental testing – Part 2: Tests - Test Cb: Damp heat, steady state, primarily for equipment.	HD 323.2.56 S1	1990
ISO 209-1	1989	Wrought aluminium and aluminium alloys - Chemical composition and forms of products - Part 1: Chemical composition.	-	-

3 Terms and definitions

For the purposes of this standard, the following terms and definitions and those given in EN 54-1:1996 apply:

3.1

typical application temperature
temperature that an installed detector can be expected to experience for long periods of time in the absence of a fire condition

NOTE This temperature is deemed to be 29 °C below the minimum static response temperature, according to the class marked on the detector, as specified in Table 1.

3.2
maximum application temperature

maximum temperature that an installed detector can be expected to experience, even for short periods of time, in the absence of a fire condition

NOTE This temperature is deemed to be 4 °C below the minimum static response temperature, according to the class marked on the detector, as specified in Table 1.

3.3
static response temperature

temperature at which the detector would produce an alarm signal if subjected to a vanishingly small rate of rise of temperature.

NOTE Rates of rise of temperature of approximately 0,2 K min^{-1} are normally found to be suitable for measuring this, however lower rates can be required in some instances (see 5.3).

4 Requirements

4.1 General

4.1.1 Compliance

In order to comply with this standard the detector shall meet the requirements clause 4,, which shall be verified by visual inspection or engineering assessment, shall be tested as described in clause 5. , and shall meet the requirements of the tests.

4.1.2 Classification

Detectors shall conform to one or more of the following classes: A1, A2, B, C, D, E, F or G according to the requirements of the tests specified in clause 5 (see Table 1).

Table 1 — Detector classification temperatures

Detector Class	Typical Application Temperature °C	Maximum Application Temperature °C	Minimum Static Response Temperature °C	Maximum Static Response Temperature °C
A1	25	50	54	65
A2	25	50	54	70
B	40	65	69	85
C	55	80	84	100
D	70	95	99	115
E	85	110	114	130
F	100	125	129	145
G	115	140	144	160

Manufacturers may optionally give additional information concerning the type of response exhibited by the detector, by adding the suffix S or R to the above classes[1)]. Detectors, which are marked with the letter S or R as a suffix to the class marking, shall be tested in accordance with the applicable test, specified in clause 5.3.7, and shall meet the requirements of that test, in addition to the tests of clause 5.

[1)] Detectors, with a suffix **S** to their class, do not respond below the minimum static response temperature, applicable to their classification (see Table 1), even at high rates of rise of air temperature. Detectors with a suffix **R** to their class, incorporate a *rate-of-rise* characteristic, which meets the response time requirements (see Table 4) for high rates of rise of air temperature even when starting at air temperatures substantially below the typical application temperature.

4.2 Operational reliability

4.2.1 Position of heat sensitive elements

Each detector shall be constructed such that at least part of its heat sensitive element(s), except elements with auxiliary functions (e.g. characteristic correctors), shall be ≥ 15 mm from the mounting surface of the detector. To confirm this, the detector shall be tested in accordance with clause 5.2.1.

4.2.2 Individual alarm indication

Class A1, A2, B, C or D detectors shall be provided with an integral red visual indicator, by which the individual detector, which released an alarm, can be identified, until the alarm condition is reset. Where other conditions of the detector can be visually indicated, they shall be clearly distinguishable from the alarm indication, except when the detector is switched into a service mode. For detachable detectors the indicator may be integral with the base or the detector head. The visual indicator shall be visible from a distance of 6 m directly below the detector, in an ambient light intensity up to 500 lux.

Class E, F or G detectors shall be provided with either an integral red indicator, or with another means for locally indicating the alarm status of the detector. To confirm this, the detector shall be assessed in accordance with clause 5.2.2.

NOTE The alarm condition is reset manually at the control and indicating equipment (See EN 54-2).

4.2.3 Connection of ancillary devices

Where the detector provides for connections to ancillary devices (e.g. remote indicators, control relays), open- or short-circuit failures of these connections shall not prevent the correct operation of the detector. To confirm this, the detector shall be assessed in accordance with clause 5.2.3.

4.2.4 Monitoring of detachable detectors

For detachable detectors, a means shall be provided for a remote monitoring system (e.g. the control and indicating equipment) to detect the removal of the head from the base, in order to give a fault signal. To confirm this, the detector shall be assessed in accordance with clause 5.2.4.

4.2.5 Manufacturer's adjustments

It shall not be possible to change the manufacturer's settings except by special means (e.g. a special code or tool, or by breaking or removing a seal). To confirm this, the detector shall be assessed in accordance with clause 5.2.5.

4.2.6 On-site adjustment of response behaviour

If there is provision for on-site adjustment of the response behaviour of the detector then:

a) for each setting, at which the manufacturer claims compliance with this standard, he shall declare a corresponding class, and for each such setting the detector shall comply with the requirements of this standard for the corresponding class, and access to the adjustment means shall only be possible by the use of a code or special tool or by removing the detector from its base or mounting;

b) any setting(s), at which the manufacturer does not claim compliance with this standard, shall only be accessible by the use of a code or special tool, and it shall be clearly marked on the detector or in the associated data, that if these setting(s) are used, the detector does not comply with the standard.

To confirm this, the detector shall be assessed in accordance with clause 5.2.6.

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

4.2.7 Marking

Each detector shall be clearly marked with the following information:

a) the number of this standard and its date(i.e. EN 54-5:2009);

b) the class(es) of the detector (e.g. A1, A1R, A1S, A2, B etc.). If the detector has provision for on-site adjustment of the class (see 4.2.6), then the marking of the class may be replaced by the symbol P;

c) the name or trademark of the manufacturer or supplier;

d) the model designation (type or number);

e) the wiring terminal designations;

f) some mark(s) or code(s) (e.g. serial number or batch code), by which the manufacturer can identify, at least, the date or batch and place of manufacture, and the version number(s) of any software, contained within the detector.

For detachable detectors, the detector head shall be marked with a), b), c), d) and f), and the base shall be marked with, at least d) (i.e. its own model designation) and e).

Where any marking on the device uses symbols or abbreviations not in common use then these shall be explained in the data supplied with the device.

The marking shall be visible during installation of the detector and shall be accessible during maintenance.

The markings shall not be placed on screws or other easily removable parts.

To confirm this, the detector shall be assessed in accordance with clause 5.2.7.

4.2.8 Data

Detectors shall either be supplied with sufficient technical, installation and maintenance data to enable their correct installation and operation[2)] or, if all of these data are not supplied with each detector, reference to the appropriate data sheet(s) shall be given on, or with each detector.

For detectors with provision for on-site adjustment of their class, these data shall identify the applicable classes and shall describe the method of programming (e.g. by selecting a switch position on the detector or a setting from a menu in the control and indicating equipment).

To confirm this, the detector shall be assessed in accordance with clause 5.2.8.

NOTE Additional information may be required by organizations certifying that detectors conform to the requirements of this standard.

4.2.9 Additional requirements for software controlled detectors

4.2.9.1 General

For detectors which rely on software control in order to fulfil the requirements of this standard, the requirements of 4.2.9.2, 4.2.9.3 and 4.2.9.4 shall be met.

[2)] To enable correct operation of the detectors, these data should describe the requirements for the correct processing of the signals from the detector. This can be in the form of a full technical specification of these signals, a reference to the appropriate signalling protocol or a reference to suitable types of control and indicating equipment etc.

4.2.9.2 Software documentation

4.2.9.2.1 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 detector;

   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.

4.2.9.2.2 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).

4.2.9.3 Software design

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

a) the software shall have a modular structure;

b) the design of the interfaces for manually and automatically generated data shall not permit invalid data to cause error in the program operation;

c) the software shall be designed to avoid the occurrence of deadlock of the programme flow.

4.2.9.4 The storage of programs and data

The program necessary to comply with this standard and any preset data, such as manufacturer's settings, shall be held in non-volatile memory. Writing to areas of memory containing this program and data shall only be possible by the use of some special tool or code and shall not be possible during normal operation of the detector.

Site-specific data shall be held in memory which will retain data for at least 2 weeks without external power to the detector, unless provision is made for the automatic renewal of such data, following loss of power, within 1 h of power being restored.

To confirm this, the detector shall be assessed in accordance with clause 5.2.9.

4.3 Nominal activation conditions/sensitivity

4.3.1 Directional Dependence requirements

The response time of the detector shall not be unduly dependent on the direction of airflow around the detector. To confirm this, the detector shall be tested in accordance with clause 5.3.1.

4.3.2 Static response temperature

The detector shall respond correctly to a slow rate of rise of air temperature. To confirm this, the detector shall be tested in accordance with clause 5.3.2.

4.3.3 Response times from typical application temperature

The detector shall respond correctly over a range of rates of rise of air temperature. To confirm this, the detector shall be tested in accordance with clause 5.3.3.

4.3.4 Response times from 25 °C

Detectors in a class with a typical application temperature above 25 °C (see Table 1) shall not exhibit an abnormally fast response to normal increases in temperature.

To confirm this, the detector shall be tested in accordance with clause 5.3.4.

This requirement is not applicable to class A1 or A2 detectors.

4.3.5 Response times from high ambient temperature (Dry heat operational)

The detector shall function correctly at high ambient temperatures appropriate to the anticipated service temperatures. To confirm this, the detector shall be tested in accordance with clause 5.3.5.