SLOVENSKI STANDARD
SIST EN 54-5:2001

01-oktober-2001

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

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

Ta slovenski standard je istoveten z: **EN 54-5:2000**

ICS:

13.220.20	Požarna zaščita	Fire protection
13.320	Alarmni in opozorilni sistemi	Alarm and warning systems

SIST EN 54-5:2001 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 54-5

December 2000

ICS 13.220.20

Supersedes EN 54-5:1976, EN 54-5:1976/A1:1988, EN 54-6:1982, EN 54-8:1982

English version

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

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

Brandmeldeanlagen - Teil 5: Wärmemelder - Punktförmige Melder

This European Standard was approved by CEN on 2 June 2000.

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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 Management Centre has the same status as the official versions.

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Ref. No. EN 54-5:2000 E

Contents

Foreword

This European Standard 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 replaces EN 54-5:1976, EN 54-5:1976/A1:1988, EN 54-6:1982, EN 54-8:1982.

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of an identical text or by endorsement, at the latest by June 2001, and conflicting national standards shall be withdrawn at the latest by June 2003. For products which have complied with the relevant national standard before the date of withdrawal (dow), as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until June 2006.

This European Standard 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).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This standard has been prepared in cooperation with the CEA (Comité Européen des Assurances) and with EURALARM (Association of European Manufacturers of Fire and Intruder Alarm Systems).

The significant differences from EN 54-5:1976+A1:1988 include:

— changes in the title of the EN 54 series and in the title of this Part;

— the integration of the requirements for high temperature heat detectors, previously covered in EN 54-8:1982 and the partial integration of the requirements for rate of rise heat sensitive detectors without a static element, previously covered by EN 54-6:1982, into this Part;

— a new classification system, combining the systems of EN 54-5:1976 and EN 54-8:1982, together with the introduction of optional suffices giving additional information on response characteristics (N.B. this allows detectors with certain rate-of-rise characteristics to be identified, such detectors were previously covered by EN 54-6 :1982);

— changes to the lower limits of response times at high rates of rise of temperature;

— changes in the environmental test procedures to use IEC tests where possible, to harmonise with test procedures applied to other types of detectors and to include EMC immunity tests;

— the requirement for an integral alarm indication.

EN 54-5:1976, EN 54-6:1982, EN 54-8:1982 and their amendments will all be withdrawn on publication of this revision.

Information on the relationship between this European Standard and other standards of the EN 54 series is given in annex A of EN 54-1:1996.

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

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to 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 - Product family standard: Immunity requirements for components of fire, intruder and social alarm systems + A1:1998.	EN 50130-4	1995
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
the 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
the 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
the 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 Compliance

In order to comply with this standard the detector shall meet the requirements of this clause, which shall be verified by visual inspection or engineering assessment, shall be tested as described in clause 5, and if applicable clause 6, and shall meet the requirements of the tests in accordance with its marked class(es).

4.2 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 6, and shall meet the requirements of that test, in addition to the tests of clause 5.

4.3 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.

[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.

4.4 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.

4.5 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.

4.6 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.

4.7 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).

4.8 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.

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

4.9 Marking

Each detector shall be clearly marked with the following information:

a) the number of this standard (i.e. EN 54-5);

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 4.8), 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.

4.10 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).

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

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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.

4.11 Additional requirements for software controlled detectors

4.11.1 General

For detectors which rely on software control in order to fulfil the requirements of this standard, the requirements of 4.11.2, 4.11.3 and 4.11.4 shall be met.

4.11.2 Software documentation

4.11.2.1 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.

4.11.2.2 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).

4.11.3 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.

4.11.4 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.

5 Tests

5.1 General

5.1.1 Atmospheric conditions for tests

Unless otherwise stated in a test procedure, the testing shall be carried out after the test specimen has been allowed to stabilize in the standard atmospheric conditions for testing as described in IEC 60068-1:1988+A1:1992 as follows:

a) temperature: (15 to 35) °C;

b) relative humidity: (25 to 75) %;

c) air pressure: (86 to 106) kPa.

NOTE If variations in these parameters have a significant effect on a measurement, then such variations should be kept to a minimum during a series of measurements carried out as part of one test on one specimen.

5.1.2 Operating conditions for tests

If a test method requires a specimen to be operational, then the specimen shall be connected to suitable supply and monitoring equipment with characteristics as required by the manufacturer's data. Unless otherwise specified in the test method, the supply parameters applied to the specimen shall be set within the manufacturer's specified range(s) and shall remain substantially constant throughout the tests. The value chosen for each parameter shall normally be the nominal value, or the mean of the specified range. If a test procedure requires a specimen to be monitored to detect any alarm or fault signals, then connections shall be made to any necessary ancillary devices (e.g. through wiring to an end-of-line device for conventional detectors to allow a fault signal to be recognised).

NOTE The details of the supply and monitoring equipment and the alarm criteria used should be given in the test report.

5.1.3 Mounting arrangements

The specimen shall be mounted by its normal means of attachment in accordance with the manufacturer's instructions. If these instructions describe more than one method of mounting then the method considered to be most unfavourable shall be chosen for each test.

5.1.4 Tolerances

Unless otherwise stated, the tolerances for the environmental test parameters shall be as given in the basic reference standards for the test (e.g. the relevant part of IEC 60068).

If a requirement or test procedure does not specify a tolerance or deviation limits, then deviation limits of ± 5 % shall be applied.

5.1.5 Measurement of response time

The specimen, for which the response time is to be measured, shall be mounted in a heat tunnel as described in 5.1.3 and annex A. It shall be connected to suitable supply and monitoring equipment in accordance with 5.1.2. The orientation of the specimen, relative to the direction of airflow, shall be that which gave the maximum response time in the directional dependence test 5.2, unless otherwise specified.

Before the measurement, the temperature of the air stream and the specimen shall be stabilized to the temperature specified in the applicable test procedure. The measurement is then made by increasing the air temperature, in the heat tunnel, linearly with respect to time, at the rate of rise specified in the applicable test procedure until the supply and monitoring equipment indicates an alarm or until the upper limit of response time for the test is exceeded. During the measurement the air flow shall be maintained at a constant mass flow, equivalent to (0,8 ± 0,1) m s^{-1} at 25 °C, and the air temperature shall be controlled to within ± 2 K of the nominal temperature required at any time during the test (see annex A). The response time is the time interval between the start of the temperature increase and the indication of an alarm from the supply and monitoring equipment.

NOTE 1 Linear extrapolation of the stabilized and the increasing temperature against time lines may be used to establish the effective start time of the temperature increase.

NOTE 2 Care should be taken not to subject detectors to a damaging thermal shock when transferring them to and from a stabilization or alarm temperature.

NOTE 3 Details and information concerning the design of the heat tunnel are given in annexes A & B

5.1.6 Provision for tests

The following shall be provided for testing compliance with this standard:

a) For resettable detectors: 15 detectors
For non-resettable detectors: 62 detectors
For non-resettable suffix S detectors: 63 detectors
For non-resettable suffix R detectors: 68 detectors;

b) The data required in 4.10.

The specimens submitted shall be representative of the manufacturer's normal production with regard to their construction and calibration.

5.1.7 Test schedule

Resettable specimens shall be arbitrarily numbered 1 to 15 by the testing organization and tested according to the test schedule in Table 2.