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Sistemi za odkrivanje in javljanje požara ter alarmiranje - 29. del: Večsenzorski javljalniki požara - Točkovni javljalniki s senzorjema za zaznavanje dima in toplote

Fire detection and fire alarm systems - Part 29: Multi-sensor fire detectors - Point detectors using a combination of smoke and heat sensors

Brandmeldeanlagen - Teil 29: Mehrfachsensor-Brandmelder - Punktförmige Melder mit kombinierten Rauch- und Wärmesensoren

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Fire detection and fire alarm systems - Part 29: Multi-sensor fire detectors - Point detectors using a combination of smoke and heat sensors

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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.

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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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Foreword

This document (prEN 54-29:2009) 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 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 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 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

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: Point fire detectors using carbon monoxide sensors

Part 27: Duct smoke detectors

Part 28: Non-resettable (digital) line type heat detectors

Part 29: Point detectors using a combination of smoke and heat sensors

Part 30: Point detectors using a combination of carbon monoxide and heat sensors

Introduction

Multi-sensor detectors combining smoke and heat sensors complying with this document are general purpose fire detectors. Multi-sensor detectors can be used to achieve:

- a high stability against deceptive phenomena,
- a response to a broad range of fires.

The response to a broad range of fires is shown by including the test fires TF1 and TF8 in addition to the test fires TF2 to TF5 which are used for detectors complying with EN 54-7.

The performance of single sensor components of a multi-sensor detector need not comply with the standards for single phenomena fire detectors (EN 54-5, EN 54-7) however the combined performance does need to meet the requirements of this standard.

This standard does not cover modes of operation, in which only one fire phenomenon is evaluated. This standard does not include tests for additional alarm outputs corresponding to the sensing of only one fire phenomenon.

1 Scope

This European Standard EN 54-29 specifies requirements, test methods and performance criteria for point-type multi-sensor fire detectors for use in fire detection systems installed in buildings (see EN 54-1:1996), incorporating in one mechanical enclosure at least one optical or ionization smoke sensor and at least one heat sensor. The overall fire detection performance is determined utilizing the combination of the detected phenomena.

Multi-sensor fire detectors having special characteristics suitable for the detection of specific fire risks are not covered by this standard. The performance requirements for any additional functions are beyond the scope of this standard (e.g. additional features or enhanced functionality for which this standard does not define a test or assessment method).

NOTE Certain types of detector contain radioactive materials. The national requirements for radiation protection differ from country to country and they are not specified in 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.

EN 54-1:1996, *Fire detection and fire alarm systems — Part 1: Introduction*

EN 54-5:2000, *Fire detection and fire alarm systems — Part 5: Heat detectors – Point detectors*

EN 54-5:2000/A1:2002, *Fire detection and fire alarm systems — Part 5: Heat detectors – Point detectors*

EN 54-7:2000, *Fire detection and fire alarm systems — Part 7: Smoke detectors — Point detectors using scattered light, transmitted light or ionization*

EN 54-7:2000/A1:2002, *Fire detection and fire alarm systems — Part 7: Smoke detectors — Point detectors using scattered light, transmitted light or ionization*

EN 54-7:2000/A2:2006, *Fire detection and fire alarm systems — Part 7: Smoke detectors — Point detectors using scattered light, transmitted light or ionization*

EN 50130-4:1995, *Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: immunity requirements for components of fire, intruder and social alarm systems*

EN 50130-4:1995/A1:1998, *Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: immunity requirements for components of fire, intruder and social alarm systems*

EN 50130-4:1995/A2:2003, *Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: immunity requirements for components of fire, intruder and social alarm systems*

EN 60068-1:1994, *Environmental testing — Part 1: General and guidance*

EN 60068-2-1:2007, *Environmental testing — Part 2-1: Tests; Test A: Cold*

EN 60068-2-2:1993, *Environmental testing — Part 2-2: Tests; Tests B; Dry heat*

EN 60068-2-2:1993/A1:1993, *Environmental testing — Part 2-2: Tests; Tests B; Dry heat*

EN 60068-2-6:1995, *Environmental testing — Part 2-6: Tests — Test Fc: Vibration*

EN 60068-2-27:1993, *Environmental testing, Test methods, Environmental testing procedures — Part 2-27: Tests; Test Ea & Guidance: Shock*

EN 60068-2-30:2005, *Environmental testing — Part 2–30: Tests; Test Db: Damp heat, cyclic (12+12 hour cycle)*

EN 60068-2-42:2003, *Environmental testing, Test methods — Part 2-42: Tests; Test Kc: Sulphur dioxide test for contacts and connections*

EN 60068-2-75:1997, *Environmental testing — Part 2-75: Tests — Test Eh: Hammer*

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

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

3 Terms and definitions

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

3.1
non-volatile memory
memory elements which do not require the presence of an energy source for the retention of their contents

3.2
site specific data
alterable data required for the detector to operate in a defined detector configuration

3.3
smoke response value
aerosol density in the proximity of a test specimen at the moment that it generates a reference signal in a smoke tunnel

3.4
heat response value
temperature in the proximity of a test specimen at the moment that it generates a reference signal in a heat tunnel

3.5
sensor
transducer, which is assigned to be receptive to one fire phenomenon and converts its information into an electrical output

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,
- be tested as described in Clause 5
- for detectors with more than one smoke sensor be tested additionally according to Annex R,
- meet the requirements of the tests.

4.2 Individual alarm indication

Each detector shall be provided with an integral red visual indicator, by which the individual detector that 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.

4.3 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.

4.4 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.

4.5 Manufacturer's adjustments

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

4.6 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, the detector shall comply with the requirements of this standard, 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.

4.7 Protection against the ingress of foreign bodies

The detector shall be so designed that a sphere of diameter (1,3 ± 0,05) mm cannot pass into the smoke sensor chamber(s).

NOTE This requirement is intended to restrict the access of insects into the sensitive parts of the detector. It is known that this requirement is not sufficient to prevent the access of all insects, however it is considered that extreme restrictions on the size of access holes may introduce the danger of clogging by dust etc. It may therefore be necessary to take other precautions against false alarms due to the entry of small insects.

4.8 Response to slowly developing fires

The provision of "drift compensation" (e.g. to compensate for sensor drift due to the build up of dirt in the detector), shall not lead to a significant reduction in the detector's sensitivity to slowly developing fires.

Since it is not practical to make tests with very slow increases in smoke density, an assessment of the detector's response to slow increases in smoke density shall be made by analysis of the circuit/software, and/or physical tests and simulations.

The detector shall be deemed to meet the requirements of this clause if this assessment shows that:

a) for any rate of increase in smoke density *R*, which is greater than *A*/4 per hour (where *A* is the detector's initial uncompensated response threshold value), the time for the detector to give an alarm does not exceed 1,6 x *A*/*R* by more than 100 s; and

b) the range of compensation is limited such that, throughout this range, the compensation does not cause the response threshold value of the detector to exceed its initial value by a factor greater than 1,6.

NOTE Further information about the assessment of these requirements is given in Annex P.

4.9 Position of the heat sensors

The detector shall be constructed such, that at least part of the heat sensing element(s) of its heat sensor(s), shall be ≥ 15 mm from the mounting surface of the detector.

4.10 Marking

Each detector shall be clearly marked with the following information:

a) number of this standard (i.e. EN 54-29:20XX);

b) name or trademark of the manufacturer or supplier;

c) model designation (type or number);

d) wiring terminal designations;

e) 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) and e), and the base shall be marked with, at least c) (i.e. its own model designation) and d).

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.

4.11 Data

Detectors shall either be supplied with sufficient technical, installation and maintenance data to enable their correct installation and operation[1)] or, if all of this data is not supplied with each detector, reference to the appropriate data sheet shall be given on, or with each detector.

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1) To enable correct operation of the detectors, this data should describe the requirements for the correct processing of the signals from the detector. This may 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.

NOTE Additional information may be required by organisations certifying that detectors produced by a manufacturer conform to the requirements of this standard.

4.12 Additional requirements for software controlled detectors

4.12.1 General

For detectors which rely on software control in order to fulfil the requirements of this standard, the requirements of 4.12.2, 4.12.3 and 4.12.4 shall be met.

4.12.2 Software documentation

4.12.2.1 Design overview

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.

4.12.2.2 Design detail

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).

4.12.3 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 program flow.

4.12.4 The storage of programs and data

The program necessary to comply with this standard and any pre-set 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 two 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 Test methods

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 EN 60068-1:1994 as follows:

— temperature: (15 to 35) °C;

— relative humidity: (25 to 75) %;

— 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 a 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 an alarm or fault signal to be recognised. The details of the supply and monitoring equipment and the alarm criteria used shall be given in the test report.