SLOVENSKI STANDARD
SIST EN 54-7:2018

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Nadomešča:
SIST EN 54-7:2001
SIST EN 54-7:2001/A1:2002
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Sistemi za odkrivanje in javljanje požara ter alarmiranje - 7. del: Dimni javljalniki - Točkovni javljalniki na principu sipanja svetlobe, prepuščene svetlobe ali ionizacije

Fire detection and fire alarm systems - Part 7: Smoke detectors - Point smoke detectors that operate using scattered light, transmitted light or ionization

Brandmeldeanlagen - Teil 7: Rauchmelder - Punktförmige Melder nach dem Streulicht-, Durchlicht- oder Ionisationsprinzip

Systèmes de détection et d'alarme incendie - Partie 7 : Détecteurs de fumée - Détecteurs ponctuels fonctionnant suivant le principe de la diffusion de la lumière, de la transmission de la lumière ou de l'ionisation

Ta slovenski standard je istoveten z: **EN 54-7:2018**

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

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 54-7

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ICS 13.220.20

Supersedes EN 54-7:2000

English Version

Fire detection and fire alarm systems - Part 7: Smoke detectors - Point smoke detectors that operate using scattered light, transmitted light or ionization

Systèmes de détection et d'alarme incendie - Partie 7 : Détecteurs de fumée - Détecteurs ponctuels fonctionnant suivant le principe de la diffusion de la lumière, de la transmission de la lumière ou de l'ionisation

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This European Standard was approved by CEN on 16 November 2015.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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 CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 54-7:2018) 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 supersedes EN 54-7:2000.

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 February 2019, and conflicting national standards shall be withdrawn at the latest by August 2022.

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 Directive(s), see informative Annex ZA, which is an integral part of this document.

EN 54-7 has been revised so as to align the second answer to the mandate M/109. It includes new clauses and annexes as follow:

— Clause 6, Assessment and verification of constancy of performance (AVCP);

— Clause 7, Classification;

— Clause 8, Marking, labelling and packaging;

— Annex N (normative), Test set up for testing the protection against the effect of moving objects;

— Annex O (normative), Apparatus open detector static object test;

— Annex P (informative), Data supplied with point smoke detectors;

— Annex ZA updated to the latest template.

The main technical changes are as follow:

— applying the latest EN 50130-4:2011, EMC for immunity tests;

— introducing the open type smoke detector and related test methods and requirements;

— removing Annex N, Additional requirements and test methods for smoke detectors with more than one smoke sensor.

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 heat detectors*;

— *Part 7: Smoke detectors — Point smoke detectors that operate using scattered light, transmitted light or ionization* [the present document];

— *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 and connectability 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*;

— *Part 26: Carbon monoxide detectors — Point smoke detectors*;

— *Part 27: Duct smoke detectors*;

— *Part 28: Non-resettable line type heat detectors*;

— *Part 29: Multi-sensor fire detectors — Point smoke detectors using a combination of smoke and heat sensors*;

— *Part 30: Multi-sensor fire detectors — Point smoke detectors using a combination of carbon monoxide and heat sensors*;

— *Part 31: Multi-sensor fire detectors — Point smoke 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*.

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.

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.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies requirements, test methods and performance criteria for point smoke detectors that operate using scattered light, transmitted light or ionization, intended for use in fire detection and fire alarm systems installed in and around buildings (see EN 54-1:2011).

This European standard provides for the assessment of verification of constancy of performance (AVCP) of point smoke detectors to this EN.

For other types of smoke detector, or smoke detectors working on different principles, this standard should only be used for guidance. Smoke detectors with special characteristics and developed for specific risks are not covered by this standard.

2 Normative references

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 54-1:2011, *Fire detection and fire alarm systems - Part 1: Introduction*

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 60068-1:2014, *Environmental testing - Part 1: General and guidance (IEC 60068-1:2013)*

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

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 60068-2-42:2003, *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)*

ISO 209:2007, *Aluminium and aluminium alloys — Chemical composition*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 54-1:2011 and the following apply.

3.1
closed detector
optical or ionization detector with the sensing volume(s) inside the enclosure

3.2
open detector
optical smoke detector with the sensing volume(s) outside the enclosure

3.3
response value
aerosol density in the proximity of the specimen at the moment that it generates an alarm signal, when tested as described in 5.1.5

Note 1 to entry: The response value may depend on signal processing in the detector and in the control and indicating equipment.

4 Requirements

4.1 Compliance

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

4.2 Operational reliability

4.2.1 Individual alarm indication

Each detector 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 lx. To confirm this, the detector shall be assessed in accordance with 5.2.1.

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

4.2.2 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 5.2.2.

4.2.3 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 5.2.3.

4.2.4 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. To confirm this, the detector shall be assessed in accordance with 5.2.4.

4.2.5 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.

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

To confirm this, the detector shall be assessed in accordance with 5.2.5.

4.2.6 Protection against the ingress of foreign bodies

4.2.6.1 Closed detectors

Closed detectors shall be so designed that a sphere of diameter (1,3 ± 0,05) mm cannot pass into the 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.

To confirm this, the detector shall be assessed in accordance with 5.2.6.1.

4.2.6.2 Open detectors

Open detector shall be designed such that:

a) a sphere of (1,3 ± 0,05) mm cannot pass into any enclosure containing active optoelectronic components;

b) a total block of the detector surface shall not cause a false alarm and shall signal a fault;

c) an object moving with minimum distance of 6 mm ± 1 mm to the nearest point of the surface of the detector shall not cause false alarm but may give fault signal.

To confirm this, the detector shall be assessed in accordance with 5.2.6.2.

4.2.7 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 value), the time for the detector to give an alarm does not exceed $1{,}6 \times A/R$ 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 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 L.

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

4.2.8 Software controlled detector (when provided)

4.2.8.1 General

For detectors which rely on software control in order to fulfil the requirements of this standard, the requirements of 4.2.8.2, 4.2.8.3 and 4.2.8.4 shall be met.

4.2.8.2 Software documentation

4.2.8.2.1 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.

4.2.8.2.2 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).

4.2.8.3 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.

4.2.8.4 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 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.

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

4.3 Nominal activation conditions/sensitivity

4.3.1 Repeatability

The detector shall demonstrate a stable behaviour with respect to its sensitivity even after a number of alarm conditions. To confirm this, the detector shall be tested in accordance with 5.3.1.

4.3.2 Directional Dependence

The response time of the detector shall not be unduly dependent on the direction of airflow around the detector. In addition, that an open detector is not unduly affected by static objects within close proximity of the detector. To confirm this, the detector shall be tested in accordance with 5.3.2.

4.3.3 Reproducibility

The sensitivity of the detector shall not vary unduly from specimen to specimen and establish response value data for comparison with the response values measured after the environmental tests. To confirm this, the detector shall be tested in accordance with 5.3.3.

4.4 Response delay (response time)

4.4.1 Air movement

The sensitivity of the detector shall not unduly be affected by the rate of the air flow, and ionization detectors shall not unduly prone to false alarms in draughts or in short gusts. To confirm this, the detector shall be tested in accordance with 5.4.1.

4.4.2 Dazzling

The sensitivity of the point smoke detector shall not unduly be influenced by the close proximity of artificial light sources. To confirm this, the point smoke detector shall be tested in accordance with 5.4.2.

4.5 Tolerance to supply voltage — Variation in supply parameters

Within the specified range(s) of the supply parameters (e.g. voltage), the point smoke detector shall not be unduly dependent on these parameters. To confirm this, the point smoke detector shall be tested in accordance with 5.5.

4.6 Performance parameters under fire conditions — Fire sensitivity

The point smoke detector shall demonstrate adequate sensitivity to a broad spectrum of smoke types as required for general application in fire detection systems for buildings. To confirm this, the point smoke detector shall be tested in accordance with 5.6.1.

4.7 Durability of Nominal activation conditions/sensitivity

4.7.1 Temperature resistance

4.7.1.1 Cold (operational)

The point smoke detector shall function correctly at low ambient temperatures appropriate to the anticipated service environment. To confirm this, the point smoke detector shall be tested in accordance with 5.7.1.1.

4.7.1.2 Dry heat (operational)

The point smoke detector shall function correctly at high ambient temperatures appropriate to the anticipated service environment. To confirm this, the point smoke detector shall be tested in accordance with 5.7.1.2.

4.7.2 Humidity resistance

4.7.2.1 Damp heat, steady-state (operational)

The point smoke detector shall function correctly at high relative humidity (without condensation), which may occur for short periods in the anticipated service environment. To confirm this, the point smoke detector shall be tested in accordance with 5.7.2.1.

4.7.2.2 Damp heat, steady-state (endurance)

The point smoke detector shall withstand the long term effects of humidity in the service environment (e.g. changes in electrical properties of materials, chemical reactions involving moisture, galvanic corrosion, etc.). To confirm this, the point smoke detector shall be tested in accordance with 5.7.2.2.

4.7.3 Corrosion resistance — Sulfur dioxide (SO_2) corrosion (endurance)

The point smoke detector shall withstand the corrosive effects of sulfur dioxide as an atmospheric pollutant. To confirm this, the point smoke detector shall be tested in accordance with 5.7.3.

4.7.4 Vibration resistance

4.7.4.1 Shock (operational)

The point smoke detector shall withstand mechanical shocks, which are likely to occur, albeit infrequently, in the anticipated service environment. To confirm this, the point smoke detector shall be tested in accordance with 5.7.4.1.

4.7.4.2 Impact (operational)

The point smoke detector shall withstand mechanical impacts upon its surface, which it may sustain in the normal service environment, and which it can reasonably be expected to withstand. To confirm this, the point smoke detector shall be tested in accordance with 5.7.4.2.

4.7.4.3 Vibration, sinusoidal, (operational)

The point smoke detector shall withstand vibration at levels considered appropriate to the normal service environment. To confirm this, the point smoke detector shall be tested in accordance with 5.7.4.3.

4.7.4.4 Vibration, sinusoidal (endurance)

The point smoke detector shall withstand the long term effects of vibration at levels appropriate to the service environment. To confirm this, the point smoke detector shall be tested in accordance with 5.7.4.4.

4.7.5 Electrical stability — Electromagnetic Compatibility (EMC), Immunity tests (operational)

The point smoke detector shall be immune to Electromagnetic influences. To confirm this, the point smoke detector shall be tested in accordance with 5.7.5.1.

5 Testing, assessment and sampling 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 as follows:

a) temperature: (15 to 35) °C;

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

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

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