

AUTOMAATNE
TULEKAHJUSIGNALISATSIOONISÜSTEEM. OSA 7:
SUITSUANDURID. HAJUTATUD VALGUST,
VALGUSEDASTUST VÕI IONISATSIOONI KASUTAVAD
PUNKTANDURID

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 54-7:2018 sisaldab Euroopa standardi EN 54-7:2018 ingliskeelset teksti.	This Estonian standard EVS-EN 54-7:2018 consists of the English text of the European standard EN 54-7:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 29.08.2018.	Date of Availability of the European standard is 29.08.2018.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 13.220.20

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

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

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

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.

CEN members are the national standards bodies of 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 United Kingdom.



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

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

Contents	Page
European foreword.....	5
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Requirements	8
4.1 Compliance	8
4.2 Operational reliability	8
4.2.1 Individual alarm indication	8
4.2.2 Connection of ancillary devices	8
4.2.3 Monitoring of detachable detectors	8
4.2.4 Manufacturer's adjustments	9
4.2.5 On-site adjustment of response behaviour	9
4.2.6 Protection against the ingress of foreign bodies	9
4.2.7 Response to slowly developing fires	9
4.2.8 Software controlled detector (when provided)	10
4.3 Nominal activation conditions/sensitivity	11
4.3.1 Repeatability	11
4.3.2 Directional Dependence	11
4.3.3 Reproducibility	11
4.4 Response delay (response time)	11
4.4.1 Air movement	11
4.4.2 Dazzling	12
4.5 Tolerance to supply voltage — Variation in supply parameters	12
4.6 Performance parameters under fire conditions — Fire sensitivity	12
4.7 Durability of Nominal activation conditions/sensitivity	12
4.7.1 Temperature resistance	12
4.7.2 Humidity resistance	12
4.7.3 Corrosion resistance — Sulfur dioxide (SO₂) corrosion (endurance)	12
4.7.4 Vibration resistance	13
4.7.5 Electrical stability — Electromagnetic Compatibility (EMC), Immunity tests (operational)	13
5 Testing, assessment and sampling methods	13
5.1 General	13
5.1.1 Atmospheric conditions for tests	13
5.1.2 Operating conditions for tests	13
5.1.3 Mounting arrangements	14
5.1.4 Tolerances	14
5.1.5 Measurement of response value	14
5.1.6 Provision for tests	15
5.1.7 Test schedule	15
5.2 Operational reliability	17
5.2.1 Individual alarm indication	17
5.2.2 Connection of ancillary devices	17
5.2.3 Monitoring of detachable detectors	17
5.2.4 Manufacturer's adjustments	17

5.2.5	On-site adjustment of response behaviour.....	17
5.2.6	Protection against the ingress of foreign bodies.....	17
5.2.7	Response to slowly developing fires.....	18
5.2.8	Software controlled detector (when provided).....	18
5.3	Nominal activation conditions/sensitivity.....	18
5.3.1	Repeatability.....	18
5.3.2	Directional dependence.....	18
5.3.3	Reproducibility.....	19
5.4	Response delay (response time).....	19
5.4.1	Air movement.....	19
5.4.2	Dazzling.....	20
5.5	Tolerance to supply voltage — Variation in supply parameters.....	21
5.5.1	Object.....	21
5.5.2	Test procedure.....	21
5.5.3	Requirements.....	21
5.6	Performance parameters under fire conditions.....	21
5.6.1	Fire sensitivity.....	21
5.7	Durability of Nominal activation conditions/sensitivity.....	23
5.7.1	Temperature resistance.....	23
5.7.2	Humidity resistance.....	24
5.7.3	Corrosion resistance — Sulfur dioxide (SO ₂) corrosion (endurance).....	26
5.7.4	Vibration resistance.....	27
5.7.5	Electrical stability.....	31
6	Assessment and verification of constancy of performance (AVCP).....	32
6.1	General.....	32
6.2	Type testing.....	32
6.2.1	General.....	32
6.2.2	Test samples, testing and compliance criteria.....	33
6.2.3	Test reports.....	33
6.3	Factory production control (FPC).....	33
6.3.1	General.....	33
6.3.2	Requirements.....	34
6.3.3	Product specific requirements.....	36
6.3.4	Initial inspection of factory and FPC.....	37
6.3.5	Continuous surveillance of FPC.....	37
6.3.6	Procedure for modifications.....	37
6.3.7	One-off products, pre-production products, (e.g. prototypes) and products produced in very low quantities.....	38
7	Classification.....	38
8	Marking, labelling and packaging.....	38
	Annex A (normative) Smoke tunnel for response value measurements.....	40
	Annex B (normative) Test aerosol for response value measurements.....	41
	Annex C (normative) Smoke measuring instruments.....	42
C.1	Obscuration meter.....	42
C.2	Measuring ionization chamber (MIC).....	42
C.2.1	General.....	42
C.2.2	Operating method and basic construction.....	43
C.2.3	Technical data.....	44
	Annex D (normative) Apparatus for dazzling test.....	46
	Annex E (informative) Apparatus for impact test.....	48

Annex F (normative) Fire test room	50
Annex G (normative) Smouldering (pyrolysis) wood fire (TF2)	52
G.1 Fuel.....	52
G.2 Hotplate.....	52
G.3 Arrangement.....	52
G.4 Heating rate.....	53
G.5 End of test condition.....	53
G.6 Test validity criteria.....	53
Annex H (normative) Glowing smouldering cotton fire (TF3)	55
H.1 Fuel.....	55
H.2 Arrangement.....	55
H.3 Ignition.....	55
H.4 End of test condition.....	56
H.5 Test validity criteria.....	56
Annex I (normative) Flaming plastics (polyurethane) fire (TF4)	57
I.1 Fuel.....	57
I.2 Arrangement.....	57
I.3 Ignition.....	57
I.4 End of test condition.....	57
I.5 Test validity criteria.....	57
Annex J (normative) Flaming liquid (n-heptane) fire (TF5)	59
J.1 Fuel.....	59
J.2 Arrangement.....	59
J.3 Ignition.....	59
J.4 End of test condition.....	59
J.5 Test validity criteria.....	59
Annex K (informative) Information concerning the construction of the smoke tunnel	61
Annex L (informative) Information concerning the requirements for the response to slowly developing fires	64
Annex M (informative) Information concerning the construction of the measuring ionization chamber	68
Annex N (normative) Test set-up for testing the protection against the effect of moving objects	71
Annex O (normative) Apparatus open detector static object test	73
Annex P (informative) Data supplied with point smoke detectors	74
Annex ZA (informative) Relationship of this European Standard with Regulation (EU) No.305/2011	75
ZA.1 Scope and relevant characteristics.....	75
ZA.2 System of Assessment and Verification of Constancy of Performance (AVCP).....	77
ZA.3 Assignment of AVCP tasks.....	77
Bibliography	79

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*