

AUTOMAATNE
TULEKAHJUSIGNALISATSIOONISÜSTEEM. OSA 26:
VINGUGAASIANDURID. PUNKTIANDURID

Fire detection and fire alarm systems - Part 26: Carbon
monoxide detectors - Point detectors

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 54-26:2015 sisaldab Euroopa standardi EN 54-26:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 54-26:2015 consists of the English text of the European standard EN 54-26:2015.
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 08.04.2015.	Date of Availability of the European standard is 08.04.2015.
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:

Aru 10, 10317 Tallinn, Eesti; 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:

Aru 10, 10317 Tallinn, Estonia; homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

ICS 13.220.20

English Version

Fire detection and fire alarm systems - Part 26: Carbon monoxide detectors - Point detectors

Système de détection et d'alarme incendie - Partie 26:
DéTECTEURS de monoXide de carbone - DéTECTEURS ponctuels

Brandmeldeanlagen - Teil 26: Kohlenmonoxidmelder -
Punktfoermige Melder

This European Standard was approved by CEN on 25 January 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, 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: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	5
Introduction.....	7
1 Scope.....	8
2 Normative references.....	8
3 Terms, definitions and abbreviations.....	9
3.1 Terms and definitions.....	9
3.2 Abbreviations.....	9
4 Requirements.....	9
4.1 General.....	9
4.2 Nominal activation conditions/sensitivity.....	9
4.2.1 Individual alarm indication.....	9
4.2.2 Rate sensitive CO response.....	9
4.2.3 Response to slowly developing fires.....	9
4.2.4 Repeatability.....	10
4.2.5 Directional dependence.....	10
4.2.6 Reproducibility.....	10
4.2.7 Air movement.....	10
4.3 Operational reliability.....	10
4.3.1 Connection of ancillary devices.....	10
4.3.2 Monitoring of detachable detectors.....	10
4.3.3 Manufacturer's adjustments.....	10
4.3.4 On-site adjustment of behaviour.....	10
4.3.5 Software controlled detectors.....	11
4.3.6 Long term stability.....	12
4.4 Tolerance to supply voltage — Variation in supply parameters.....	12
4.5 Performance parameters under fire conditions — Fire sensitivity.....	12
4.6 Durability of nominal activation conditions/sensitivity.....	12
4.6.1 Temperature resistance.....	12
4.6.2 Humidity resistance.....	12
4.6.3 Corrosion resistance — SO ₂ corrosion (endurance).....	13
4.6.4 Shock and vibration resistance.....	13
4.6.5 Electrical stability — EMC, immunity (operational).....	13
4.6.6 Resistance to chemical agents.....	13
5 Test and assessment methods.....	14
5.1 General.....	14
5.1.1 Atmospheric conditions for tests.....	14
5.1.2 Operating conditions for tests.....	14
5.1.3 Mounting arrangements.....	14
5.1.4 Tolerances.....	14
5.1.5 Measurement of CO response value.....	14
5.1.6 Provision for tests.....	15
5.1.7 Test schedule.....	15
5.2 Nominal activation conditions/sensitivity.....	16
5.2.1 Individual alarm indication.....	16
5.2.2 Rate sensitive CO response.....	17
5.2.3 Response to slowly developing fires.....	17
5.2.4 Repeatability.....	17
5.2.5 Directional dependence.....	18
5.2.6 Reproducibility.....	18

5.2.7	Air movement.....	19
5.3	Operational reliability.....	19
5.3.1	Connection of ancillary devices	19
5.3.2	Monitoring of detachable detectors	19
5.3.3	Manufacturer's adjustments.....	19
5.3.4	On-site adjustment of behaviour	19
5.3.5	Software controlled detectors.....	19
5.3.6	Long term stability	19
5.4	Tolerance to supply voltage	20
5.4.1	Variation in supply parameters.....	20
5.5	Performance parameters under fire conditions	21
5.5.1	Fire sensitivity	21
5.6	Durability of nominal activation conditions/sensitivity.....	23
5.6.1	Temperature resistance	23
5.6.2	Humidity resistance	25
5.6.3	Corrosion resistance — SO ₂ corrosion (endurance).....	29
5.6.4	Shock and vibration resistance	30
5.6.5	Electrical stability.....	34
5.6.6	Resistance to chemical agents	35
6	Assessment and verification of constancy of performance (AVCP)	37
6.1	General	37
6.2	Type testing	37
6.2.1	General	37
6.2.2	Test samples, testing and compliance criteria	38
6.2.3	Test reports.....	39
6.3	Factory production control (FPC).....	39
6.3.1	General	39
6.3.2	Requirements.....	40
6.3.3	Product specific requirements.....	42
6.3.4	Initial inspection of factory and FPC	42
6.3.5	Continuous surveillance of FPC	43
6.3.6	Procedure for modifications.....	43
6.3.7	One-off products, pre-production products, (e.g. prototypes) and products produced in very low quantities	43
7	Classification	44
8	Marking, labelling and packaging.....	44
Annex A	(normative) Gas test chamber for response value and cross-sensitivity	46
A.1	General	46
A.2	Gas test chamber specification	46
Annex B	(normative) CO and smoke measuring instruments	48
B.1	General	48
B.2	CO measuring instrument	48
B.3	Obscuration meter.....	48
B.4	Measuring ionization chamber (MIC).....	48
Annex C	(normative) Fire test room.....	49
C.1	General	49
C.2	Fire test room specification.....	49
Annex D	(informative) Establishing exposure levels of chemical agents.....	52
D.1	General	52
D.2	Establishing concentration of chemical agents for test gases 1 to 9.....	52
D.3	Verification of test chamber leakage.....	52
D.4	Establishing concentration of ozone	52
Annex E	(normative) Smouldering (pyrolysis) wood fire (TF2).....	54

E.1	General	54
E.2	Fuel	54
E.3	Hotplate	54
E.4	Arrangement	54
E.5	Heating rate	54
E.6	End of test condition	54
E.7	Test validity criteria	54
Annex F	(normative) Glowing smouldering cotton fire (TF3)	59
F.1	General	59
F.2	Fuel	59
F.3	Arrangement	59
F.4	Ignition	60
F.5	End of test condition	60
F.6	Test validity criteria	61
Annex G	(informative) Information concerning the construction of the gas test chamber	64
G.1	General	64
G.2	Construction of the gas test chamber	64
Annex H	(informative) Apparatus for impact test	66
H.1	General	66
H.2	Apparatus construction	66
Annex ZA	(informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation	69
Bibliography	79

Foreword

This document (EN 54-26:2015) 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 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2015, and conflicting national standards shall be withdrawn at the latest by April 2019.

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.

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 Regulations, 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 detectors — Point detectors;*
- *Part 11: Manual call points;*
- *Part 12: Smoke detectors — Line detectors using an optical light beam;*
- *Part 13: Compatibility 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 detectors* [the present document];
- *Part 27: Duct smoke detectors;*
- *Part 28: Non-resettable line type heat detectors* [currently at drafting stage];
- *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 fire detectors — Point 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* [currently at acceptance stage].

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.

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Carbon monoxide (CO) is a product of the incomplete combustion of carbon-based materials. CO fire detectors can react promptly to smouldering fires involving carbonaceous materials because CO does not depend solely on convection, but also moves by diffusion. CO fire detectors might be better suited to applications where other fire detection techniques are prone to false alarms, i.e. due to dust, steam and cooking vapours.

The purpose of this standard is to ensure that carbon monoxide (CO) fire detectors have adequate sensitivity and reliability for use in fire detection and fire alarm systems for residential commercial and industrial premises. CO may not be produced in detectable quantities where pyrolysis of material rather than self-sustained combustion occurs (e.g. overheating cables) or in the early stages of rapidly burning flaming fires (e.g. liquid fuel fires). It is important that carbon monoxide fire detectors are only used where a risk assessment indicates that they are appropriate for detecting the types of fires that may occur. CO fire detectors should not be considered as a direct replacement for smoke detectors. CO fire detectors detect carbon monoxide gas rather than the smoke particulates detected by optical and ionization smoke detectors.

A number of different methods for sensing CO are suitable. However, most sensors will also be influenced by other gases and phenomena. Tests have therefore been included in the test schedule to assess cross-sensitivity to substances normally present in the service environment that may affect the performance of the detector.

As CO detectors are specifically well suited for the detection of incipient fires rather than flaming fires this standard only includes tests to verify performance in smouldering fires. For this purpose, test fires TF2 and TF3 from EN 54-7 have been included in the test schedule. An additional validity criterion has been added to each of these tests to make them suitable for evaluating CO fire detectors.

1 Scope

This European Standard specifies requirements, test methods and performance criteria for point detectors using carbon monoxide sensing for use in fire detection and fire alarm systems in and around buildings (see EN 54-1:2011).

This European Standard provides for the assessment and verification of consistency of performance (AVCP) of carbon monoxide point detectors to this EN.

This European Standard does not apply to fire detectors incorporating at least one CO sensing element in combination with other elements sensing different fire phenomena.

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

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 54-7:2000¹⁾, *Fire detection and fire alarm systems — Part 7: Smoke detectors — Point detectors using scattered light, transmitted light or ionization*

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 60068-2-2:2007, *Environmental testing — Part 2-2: Tests — Test B: Dry heat (IEC 60068-2-2:2007)*

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 60068-2-30:2005, *Environmental testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 h + 12 h cycle) (IEC 60068-2-30:2005)*

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)*

¹⁾ This document is currently impacted by the stand-alone amendments EN 54-7:2000/A1:2002 and EN 54-7:2000/A2:2006.

ISO 209:2007, *Wrought aluminium and aluminium alloys — Chemical composition and forms of products — Part 1: Chemical composition*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1

CO response value

CO concentration 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.

3.1.2

rate-sensitive

behaviour of a detector that depends on the rate of change of CO concentration

3.2 Abbreviations

EMC Electromagnetic compatibility

4 Requirements

4.1 General

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 or shall be tested as described in Clause 5.

4.2 Nominal activation conditions/sensitivity

4.2.1 Individual alarm indication

The 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 when assessed as described in 5.2.1.

4.2.2 Rate sensitive CO response

The CO response value of the detector may depend on the rate of change of CO concentration in the vicinity of the detector. Such behaviour may be incorporated in the detector design to improve the discrimination between ambient CO levels and those generated by a fire. If such rate sensitive behaviour is included then it shall not lead to a significant reduction in the detector's sensitivity to fires, nor to a significant increase in the probability of false alarm when assessed as specified in 5.2.2.

4.2.3 Response to slowly developing fires

Point carbon monoxide detectors may incorporate provision for "drift compensation", for example to compensate for sensor drift due ageing of the CO sensor or the build-up of contaminants in the detector, If