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BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

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Responsible Committee Secretary: Mr Christopher Smith-Wong (BSI)

Direct tel: 020 8996 7086

E-mail: christopher.smith-wong@bsigroup.com

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

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: Kohlenmonoxidsmelder -
Punktförmige Melder

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 72.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 54-26:2024) 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 will supersede EN 54-26:2015.

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 can be added. For current status of published standards refer to www.cencenelec.eu.

In comparison with the previous edition EN 54-26:2015, the following technical modifications have been made:

- removal of directional dependence test and requirements for mounting orientation for fire tests and CO response value measurement have been modified;
- removal of Air Movement test;
- in the Shock (operational) test the peak acceleration has been reduced as agreed by CEN/TC 72;
- in the Exposure to high level of carbon monoxide (operational) test the conditioning is at 500 $\mu\text{l/l}$ to align with other EN 54 CO standards;
- modification of Annex A, Gas test chamber and Annex F, Construction of the gas test chamber. This allows the use of a diffusion test chamber in addition to the previously specified recirculating test chamber.

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 document 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. In many fire situations CO is not 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 document 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.

CO detectors are intended to be installed indoors, and only indoor environmental test severities are specified in the test schedule.

The environmental tests specified in this standard cover normal general conditions. Other directives or regulations applicable to the CO fire detector or installation guidelines may require other environmental test methods or conditions (including test apparatus, procedure, and conditioning).

1 Scope

This document specifies product characteristics, test methods and performance criteria for point detectors using carbon monoxide sensing (CO fire detectors) for use in fire detection and fire alarm systems for buildings and civil engineering works.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 54-1:2021, *Fire detection and fire alarm systems — Part 1: Introduction*

EN 54-7:2018, *Fire detection and fire alarm systems — Part 7: Smoke detectors — Point smoke detectors that operate using scattered light, transmitted light or ionization*

EN 50130-4:2011+A1:2014, *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 + 12h 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)*

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 54-1:2021 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/ui/#home>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

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 4.1.5

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

3.2

rate -sensitive

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

4 Requirements and assessments

4.1 General testing methods

4.1.1 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 60068-1:2014 as follows:

- temperature: (15 to 35) °C;
- relative humidity: (25 to 75) %;
- 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.

The ambient concentration of CO shall not exceed 3 µl/l.

4.1.2 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 recognized.

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

4.1.3 Mounting arrangements

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

4.1.4 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 EN 60068).

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

4.1.5 Measurement of CO response value

The specimen, for which the CO response value shall be measured, shall be installed in the gas test chamber, described in Annex A, in its normal operating position, by its normal means of attachment. The orientation of the specimen, relative to the direction of airflow or gas diffusion, shall be selected arbitrarily and recorded.

Before commencing each measurement, the gas test chamber shall be purged with clean air to ensure that the concentration of CO in the chamber is less than $1,5\ \mu\text{l/l}$.

Unless otherwise specified in the test procedure, the air temperature in the gas test chamber shall be $(23 \pm 5)\ ^\circ\text{C}$ and shall not vary by more than 5 K for all the measurements.

The specimen shall be connected to its supply and monitoring equipment as described in 4.1.2 and shall be allowed to stabilize for a period of at least 15 min, unless otherwise specified by the manufacturer.

CO shall be introduced into the gas test chamber such that the rate of increase of CO concentration is between $1\ \mu\text{l/l}$ per min and $6\ \mu\text{l/l}$ per min, unless otherwise specified in the test procedure. For detectors with a rate sensitive behaviour, the manufacturer may specify a rate of increase within this range to ensure that the measured CO response value is representative of the static CO response value of the detector.

The same target rate of increase of CO concentration should be used for all measurements on a particular detector type. Above $20\ \mu\text{l/l}$ during the ramp the measured CO concentration shall not vary by more than $\pm 2\ \mu\text{l/l}$ from the target value.

The CO concentration at the moment that the specimen gives an alarm shall be recorded as $S\ (\mu\text{l/l})$. This shall be taken as the CO response value.

NOTE The typical range of response values is between $25\ \mu\text{l/l}$ and $60\ \mu\text{l/l}$.

4.1.6 Environmental tests of combined products

Where the CO fire detector has an additional function which in the scope of another standard in the EN 54 series (e.g. a detector and sounder or a manual call point and transmission path/short-circuit isolator), the following points shall be considered for each environmental test when applied to the CO fire detector:

- a) if the specific environmental test exists in both standards and the environmental conditions (including test apparatus, procedure, and conditioning, when applicable) are the same, then the conditioning shall be done only once. Tests before and after the conditioning shall be conducted according to both standards as well as monitoring of all relevant signals of both standards during the conditioning phase.

When special equipment to monitor and operate the specimen during/after conditioning is needed, the equipment of both standards can be used together or in combination when it is assured that it has no impact to the environmental conditions or the test and monitoring results. If this is not possible or in cases of doubt, the environmental tests shall be done twice, each test based on applying the standards separately and independently;

- b) if the specific environmental test exists in both the standards but the environmental conditions (including test apparatus, procedure, and conditioning, when applicable) are not the same, then the

environmental tests shall be done twice, each test based on applying the standards separately and independently.

Measurements and monitoring signals as well as requirements shall be independent for each environmental test. If it is expected that the environmental conditions will harm the product in any way, a separate sample shall be used for each test;

- c) if the specific environmental test exists only in one standard, then the environmental test shall be done only once. Measurements and monitoring of signals, as well as any other requirement, shall be applied only according to the standard that specifies the environmental test.

NOTE 1 Environmental tests are tests where the product is exposed to specific environmental conditions. Measurements before, during or after the conditioning are performed to assess the ability of the product to function correctly during or after the conditioning.

NOTE 2 The logic of the above specified procedure can also be applied in cases where the product is in the scope of three or more standards by comparing pairs of standards in turn.

NOTE 3 Case c) implies that it is acceptable for an additional function to be susceptible to (or adversely affected) by the conditioning. However, careful attention is needed to the criteria for each environmental test as expressed in the standard being applied to ensure that the appropriate criteria is used.

4.2 Individual alarm indication

4.2.1 Objective

The CO fire detector is assessed to demonstrate the provision of an integral visual alarm indicator, by which the detector that released an alarm can be identified, until the alarm indicator is externally reset.

For detachable detectors, the indicator may be integral with the base or the detector head.

4.2.2 Assessment method

One specimen shall be mounted in an ambient light intensity up to 500 lx at a distance of 6 m from the observer. The mounting surface shall be perpendicular to the line of view.

When the detector is in alarm condition, it shall be indicated by a visual alarm indicator. The visibility of the indicator shall be confirmed, and the colour of the indicator shall be recorded. The alarm indication shall then be reset by an external signal.

Where other conditions of the detector can be visually indicated, it shall be confirmed and recorded that they are clearly distinguishable from the alarm indication, except when the detector is switched into a service mode.

4.2.3 Requirements

There shall be at least one distinguishable red alarm indicator, and the alarm indicator shall be resettable by an external signal.

4.3 Rate sensitive CO response

4.3.1 Objective

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.

The CO fire detector is assessed to demonstrate that 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.

4.3.2 Assessment method

The behaviour of the CO fire detector to rate sensitive CO response shall be assessed by analysis of the circuit/software, and/or by physical tests and simulations.

NOTE This approach is used as it is not practical to make tests with all possible rates of increase in CO concentration.

4.3.3 Requirements

The CO fire detector shall not signal an alarm condition when subjected to a step change in CO concentration of 10 µl/l, superimposed on a background level between 0 µl/l and 1,5 µl/l.

4.4 Response to slowly developing fires

4.4.1 Objective

The CO fire detector is assessed to demonstrate that if automatic offset compensation" is provided, for example to compensate for ageing of the CO sensor or the build-up of contaminants, then it shall not lead to a significant change in the detector's sensitivity to slowly developing fires.

4.4.2 Assessment method

An analysis of the circuit/software and/or physical or software simulations of the CO fire detector's response to slow increases in CO concentration shall be conducted to assess the provision for "drift compensation".

NOTE 1 This approach is used as it is not practical to make tests with all possible rates of increase in CO concentration.

NOTE 2 Further information about the assessment is given in Annex I.

4.4.3 Requirements

If drift compensation is provided:

- a) for any rate of increase in CO concentration R , which is greater than $S/4$ per hour (where S is the detector's initial uncompensated CO response value), the time for the detector to give an alarm or reach the compensated CO response value shall not exceed $1,6 \times S/R$ by more than 100 s;
- b) The range of compensation shall be limited such that, throughout this range, the compensation does not cause the CO response value of the detector to change from its initial value by a factor greater than 1,6.

4.5 Connection of ancillary devices

4.5.1 Objective

The CO fire detector is assessed to demonstrate that 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.

4.5.2 Assessment method

One specimen shall be mounted as described in 4.1.3, shall be connected to supply and monitoring equipment as described in 4.1.2 and a simple functional test, i.e. providing a stimulus sufficient to generate an alarm condition shall be conducted while each connection to ancillary devices has open- or short-circuit failure.

4.5.3 Requirements

Where the detector provides for connections to ancillary devices the detector operates correctly with open or short circuit failures on any connection to ancillary devices.

4.6 Monitoring of detachable detectors

4.6.1 Objective

The CO fire detector is assessed to demonstrate the provision of means for a remote monitoring system (e.g. the control and indicating equipment) to detect the removal of the head from the base of the detector.

4.6.2 Assessment method

For detachable detectors, one specimen shall be mounted as described in 4.1.3, shall be connected to supply and monitoring equipment as described in 4.1.2 and a visual inspection shall be conducted while removing the head from the base.

4.6.3 Requirements

If the CO fire detector is detachable the removal of the detector head from the base is indicated as fault signal at a remote monitoring system.

4.7 Manufacturer's adjustments

4.7.1 Objective

The CO fire detector is assessed to demonstrate that it shall not be possible to change the manufacturer's settings except by special means.

4.7.2 Assessment method

A visual inspection of one specimen and its supporting data shall be conducted to assess the possibilities of changing the manufacturer's settings.

4.7.3 Requirements

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).

4.8 On-site adjustment of response behaviour

4.8.1 Objective

The CO fire detector is assessed to demonstrate that if on site adjustment of response behaviour is provided it should not enable non-compliance with this standard unless this is clearly marked.

4.8.2 Assessment method

A visual inspection of one specimen and its supporting data shall be conducted in conjunction with the appropriate operation of the detector in order to assess the possibilities of on-site adjustment of the detector response behaviour.

4.8.3 Requirements

If there is provision for on-site adjustment of the response behaviour of the detector, then the response behaviour can only be adjusted by the use of a code or special tool or by removing the detector from its base or mounting.

NOTE On-site adjustment of the detector response behaviour can either be carried out at the detector or via the control and indicating equipment. A control and indicating equipment is considered a special tool.

4.9 Software controlled detectors

4.9.1 Objective

CO fire detectors which rely on software control are assessed to ensure the reliability of the software.

4.9.2 Assessment method

4.9.2.1 General

For CO fire detectors which rely on software control the manufacturer software documentation shall be visually assessed as in 4.9.2.2 and 4.9.2.3.

4.9.2.2 Design overview

The software documentation shall be in sufficient detail for the design to be inspected 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.

4.9.2.3 Design detail

If the design overview of 4.9.2.2 is not sufficient for the assessment additional documentation 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).

4.9.3 Requirements

The software shall have the following characteristics:

- a) the software has a modular structure;
- b) the design of the interfaces for manually and automatically generated data does not permit invalid data to cause error in the program operation;
- c) the software is designed to avoid the occurrence of deadlock of the program flow;
- d) the program and pre-set data are held in non-volatile memory;
- e) writing to areas of memory containing the program and pre-set data are only be possible by the use of some special tool or code and shall not be possible during normal operation of the detector;
- f) site-specific data are 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.

4.10 Repeatability

4.10.1 Objective

The CO fire detector is assessed to demonstrate that it has stable behaviour with respect to its sensitivity, even after a number of alarm conditions.

4.10.2 Assessment method

The CO response value of one specimen shall be measured as described in 4.1.5 six times.

4.10.3 Requirements

The maximum response value shall be designated $S_{\max}$, the minimum value shall be designated $S_{\min}$.

The ratio of the CO response values $S_{\max}: S_{\min}$ shall not be greater than 1,6.

The lower CO response value $S_{\min}$ shall not be less than 25 $\mu\text{l/l}$.

4.11 Variation in supply parameters

4.11.1 Objective

The CO fire detector is assessed to show that, within the specified range(s) of the supply parameters (e.g. voltage), the sensitivity is not unduly dependent on these parameters.

4.11.2 Assessment method

The response value of the specimen shall be measured as described in 4.1.5, at the upper and lower limits of the supply parameter (e.g. voltage) range(s) specified by the manufacturer. For the test the manufacturer may provide suitable supply equipment to allow the supply parameters to be changed as required.

The maximum response value shall be designated $S_{\max}$ and the minimum value shall be designated $S_{\min}$.

NOTE For conventional CO fire detectors, the supply parameter is the dc voltage applied to the detector. For other types of detectors (e.g. addressable) signal levels and timing need to be considered to evaluate a corresponding voltage applied to the detector.

4.11.3 Requirements

The ratio of the CO response values $S_{\max}$: $S_{\min}$ shall not be greater than 1,6.

The lower CO response value $S_{\min}$ shall not be less than 25 µl/l.

4.12 Reproducibility

4.12.1 Objective

The CO fire detector is assessed to demonstrate that the sensitivity of the detector does not vary unduly from specimen to specimen.

4.12.2 Assessment method

The CO response value of all test specimens (minimum 20) shall be measured as described in 4.1.5.

The specimens shall be representative of the manufacturer's production limits with regard to their construction and calibration. The upper and lower limits of the response values of all the specimens shall also represent the upper and lower limit of the production.

4.12.3 Requirements

The mean of these CO response values shall be calculated and shall be designated S_{mean} .

The maximum response value shall be designated $S_{\max}$ and the minimum value shall be designated $S_{\min}$.

The ratio of the CO response values $S_{\max}$: S_{mean} shall not be greater than 1,33 and the ratio of the CO response values S_{mean} : $S_{\min}$ shall not be greater than 1,5.

The lower CO response value $S_{\min}$ shall not be less than 25 µl/l.

4.13 Fire sensitivity

4.13.1 Objective

The CO fire detector is assessed to demonstrate that it has adequate sensitivity to a broad spectrum of fire types for the application in fire detection systems.

4.13.2 Assessment method

4.13.2.1 General

Four specimens are mounted in a standard fire test room and are exposed to a series of test fires designed to produce smoke and CO.

The specimens shall be representative of least sensitive specimen of the manufacturer's production limits (i.e. those with the latest response time when subjected to the test fires). In case of doubt the manufacturer shall select representative specimen.

NOTE The specimen can be taken from the four least sensitive specimens of the reproducibility test.

4.13.2.2 Fire test room

The fire sensitivity tests shall be conducted in a rectangular room with a flat horizontal ceiling, and the following dimensions:

- length: 9 m to 11 m;
- width: 6 m to 8 m;
- height: 3,8 m to 4,2 m.

The fire test room shall be equipped with the following measuring instruments arranged as indicated in Annex C:

- temperature probe;
- measuring ionization chamber (MIC);
- obscuration meter;
- CO monitor.

4.13.2.3 Test fires

The specimens shall be subjected to two test fires, TF2 and TF3. The type, quantity and arrangement of the fuel and the method of ignition are described in Annex D and Annex E, along with the end of test condition and the required profile curve limits.

In order to be a valid test fire, the development of the fire shall be such that the profile curves of m against y , m against time, and S against time fall within the specified limits, up to the time when all of the specimens have generated an alarm signal or the end of test condition is reached, whichever is the earlier. If these conditions are not met, then the test is invalid and shall be repeated. It is permissible, and may be necessary, to adjust the quantity, condition (e.g. moisture content) and arrangement of the fuel to obtain valid test fires.

4.13.2.4 Mounting of the specimens

The specimens shall be mounted on the fire test room ceiling in the designated area (see Annex C). The specimens shall be mounted in accordance with the manufacturer's instructions, such that specimens are in different orientations with respect to the fire, in 90° steps. If there is some asymmetry in the CO sensor position within the detector, then the first orientation should be with the CO sensor placed away from the fire. If there is no asymmetry in the CO sensor position within the detector, then an LED or other distinguishing feature should be used as the initial orientation and the feature used shall be recorded.

Each specimen shall be connected to its supply and monitoring equipment, as described in 4.1.2, and shall be allowed to stabilize in its quiescent condition before the start of each test fire.

For detectors which dynamically modify their sensitivity in response to varying ambient conditions and require special reset procedures or stabilization times, or both, the manufacturer's guidance shall be sought to ensure that the state of the detectors at the start of each test is representative of their normal quiescent state.