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SIST EN 50291-1:2018

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Javljalniki plina - Električne naprave za odkrivanje ogljikovega monoksida v gospodinjstvih - 1. del: Preskusne metode in zahtevane lastnosti

Gas detectors - Electrical apparatus for the detection of carbon monoxide in domestic premises - Part 1: Test methods and performance requirements

Gaswarngeräte - Elektrische Geräte für die Detektion von Kohlenmonoxid in Wohnhäusern - Teil 1: Prüfverfahren und Anforderungen an das Betriebsverhalten

Détecteurs de gaz - Appareils électriques pour la détection de monoxyde de carbone dans les locaux à usage domestique - Partie 1 : Méthodes d'essai et exigences de performances

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13.320	Alarmni in opozorilni sistemi	Alarm and warning systems

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Détecteurs de gaz - Appareils électriques pour la détection de monoxyde de carbone dans les locaux à usage domestique - Partie 1 : Méthodes d'essai et exigences de performances

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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European foreword

This document (EN 50291-1:2018) has been prepared by Technical Committee CLC/TC 216 “Gas detectors”, the secretariat of which is held by BSI.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-02-26
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2021-02-26

This document supersedes EN 50291-1:2010.

The main technical changes compared to the previous edition EN 50291-1:2010 are:

— End of Life indicator has been made mandatory and must include an audible and visible warning;

— Guidance has been added for assessing battery capacity and expected life;

— Requirements for mains powered alarms with back-up supply have been added;

— The number of potential interference gases has been increased;

— Tests have been added for an optional alarm silence facility;

— Requirements for the audible alarm and associated red visual signal have been clarified; low battery, fault and End-of-life audible and visual warnings are given in an informative annex;

— An informative annex has been added for apparatus displaying low (Warning) CO levels;

— Requirements have been added for apparatus using radio links;

— The sound output alarm requirement has been increased in line with the EN 14604 smoke alarm requirements.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

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1 Scope

This European Standard specifies general requirements for the construction, testing and performance of electrically operated carbon monoxide gas detection apparatus, designed for continuous operation in domestic premises. The objective is to detect defective fossil fuel or solid fuel appliances so that they can be repaired or replaced. The function of the standard is not to monitor low levels of CO for health purposes. (Annex F gives recommendations for units displaying low (warning) CO concentrations). The apparatus may be mains-powered or battery-powered. Such apparatus is intended to warn of an acute level of CO, enabling the occupant to react before being exposed to significant risk.

Additional requirements for apparatus to be used in recreational vehicles and similar premises are specified in EN 50291-2.

NOTE 1 For caravan holiday homes EN 50291-1 applies.

This European Standard specifies two types of apparatus, these are:

— type A – to provide a visual and audible alarm and an executive action in the form of a transmittable output signal that can be used to actuate directly or indirectly a ventilation or other ancillary device;

— type B – to provide a visual and audible alarm only.

NOTE 2 Both type A and type B apparatus can be interconnected.

This European Standard excludes apparatus for:

— the detection of combustible gases, other than carbon monoxide itself (see EN 50194-1);

— the detection of CO in industrial installations (see EN 45544-1, EN 45544-2 and EN 45544-3) or commercial premises;

— CO measurement for smoke and fire detection;

— CO measurement in carparks and tunnels.

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NOTE 3 See EN 50545–1.

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 50270, *Electromagnetic compatibility — Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen*

EN 50271:2010, *Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen — Requirements and tests for apparatus using software and/or digital technologies*

EN 50292, *Electrical apparatus for the detection of carbon monoxide in domestic premises, caravans and boats — Guide on the selection, installation, use and maintenance*

EN 60335-1:2012, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2010, modified)*

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3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
ambient conditions
normal atmosphere surrounding the apparatus

3.2
clean air
air that has concentrations of less than 3 ppm of carbon monoxide and does not contain interfering and contaminating substances

3.3
domestic premises
any house or building being a place of residence or home of a household, family or person

3.4
fixed installation
apparatus which is intended to have all parts except replaceable batteries permanently installed

3.5
sensor
device, part of the apparatus, the output of which will change in the presence of carbon monoxide

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3.6
sensing element
part of the sensor which is sensitive to the gas/vapour to be measured

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3.7
volume ratio (V/V)
ratio of the volume of a component to the volume of the gas mixture

3.8
transmittable output signal
signal characterised by a standby and an activation state by which action may be initiated

EXAMPLE Triggering a ventilation device.

3.9
warm-up time
time interval between the time when the apparatus is switched on and the time when the apparatus is fully operational

3.10
alarm set points
fixed settings of the apparatus that determines the volume ratios and durations of exposure at which the apparatus will automatically initiate an alarm and, for type A apparatus a transmittable output signal

3.11
fault warning
visual and audible signal indicating a faulty or failed apparatus

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3.12
mains-powered apparatus
apparatus designed to be powered by the normal domestic mains electrical supply, with or without an alternative power source

3.13
battery-powered apparatus
apparatus designed to be powered by batteries only

3.14
continuous operation
apparatus which is continuously powered with continuous or intermittent automatic sensing

3.15
recreational vehicle
recreational vehicles considered by this European Standard include recreational craft, caravans and motor caravans

Note 1 to entry: Other motorised vehicles like trucks are known to have residential accommodation. They are not recreational vehicles but are considered as similar premises in respect of this European Standard.

3.16
caravan holiday home
transportable leisure accommodation vehicle that does not meet requirements for construction and use of road vehicles, that retains means for mobility and that is for temporary or seasonal occupation

[Source: EN 13878:2003]

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3.17
apparatus
carbon monoxide detection device, which may also be generically termed “detector”, comprising the sensor, remote sensor if applicable, alarm and any other circuit components, power supply and, for type A apparatus, a means of providing an transmittable output signal

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3.18
end-of-life
point in time when the apparatus should be replaced

3.19
sealed-for-life
self-contained apparatus where the battery, sensor or any other component cannot be tampered with or replaced

3.20
non-replaceable battery-powered apparatus
apparatus where the battery cannot be tampered with or replaced

3.21
free-field conditions
conditions where there are a minimum number of sound reflecting surfaces or radio frequency reflecting surfaces

3.22
detector
see 3.17

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4 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply.

U_E supply voltage at which the low battery warning is given.

U_R rated battery voltage.

R_A resistance at which the low battery warning is given with a supply voltage U_R.

5 Design requirements

5.1 General requirements

5.1.1 Unless otherwise stated, the requirements specified are applicable to both type A and type B apparatus.

5.1.2 The apparatus shall reliably detect the presence of carbon monoxide in domestic premises under the stated application conditions, shall produce an alarm, and in the case of type A apparatus, shall be able to initiate executive actions whenever the conditions (in terms of both level and duration) exceed pre-set alarm set points.

5.1.3 Apparatus which includes functionality additional to carbon monoxide detection shall perform according to the requirements of this European Standard and it is recommended that it meets the requirements of the applicable European Standard or equivalent relevant to the additional functionality.

5.1.4 The apparatus, electrical assemblies and components shall comply with the requirements of 5.2 to 5.14 and the performance requirements of Clause 6.

For apparatus utilizing radio links, the requirements of Clause 7 shall be met.

Apparatus shall be designed for continuous operation.

The apparatus shall not be class 0 as defined in EN 60335-1:2012, 3.3.7.

5.1.5 Where the CO sensor is replaceable, the design of the apparatus shall be such that replacement of the sensor does not affect compliance with the requirements of this European Standard.

This condition shall be verified using the information and the documentation given by the manufacturer of the apparatus.

5.1.6 The apparatus shall indicate end-of-life as per 5.5.4.

5.1.7 The apparatus shall be provided with an installation and maintenance instruction booklet or leaflet meeting the requirements of Clause 8.

5.1.8 The apparatus shall be designed so as to discourage unauthorised interference or adjustment.

5.1.9 Except for batteries and replaceable CO sensors, the apparatus shall not have any user replaceable or serviceable components.

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5.2 Construction

The apparatus shall comply with the appropriate requirements of EN 60335-1 as listed in Table 1.

When the sensor is replaceable: Mechanical and/or electrical means shall guarantee the replacement of the sensor without errors. In the case of electrical recognition of the incorrect connection or absence of the sensor, the apparatus shall give an automatic signal of a fault. Moreover, it shall either be impossible, or recognized as an error, to connect a sensor not designed for carbon monoxide to a carbon monoxide apparatus.

Table 1 — Construction requirements

Constructional requirement	EN 60335–1:2012 **(Sub)clause**
Protection against access to live parts	8
Heating	Relevant parts of 11
Leakage current and electric strength at operating temperature	13
Moisture resistance	15.1 and 15.3
Leakage current and electrical strength	16
Overload protection of transformers and associated circuits	17
Abnormal operation	19
Mechanical strength	21
Construction	22
Internal wiring	23
Components	24.1, 24.2 and 24.4
Supply connection and external flexible cords	25.3
Terminals for external conductors	26
Provision for earthing	27
Screws and connections	28
Clearances, creepage distances and solid insulation	29
Resistance to heat and fire	30
Resistance to rusting	31

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5.3 Visual indicators

5.3.1 The power supply visual indicator shall be fitted and shall be coloured green. For mains-powered apparatus the visual indicator shall be continuously illuminated. For battery powered apparatus the visual indicator shall flash at least once per minute.

NOTE Annex C provides further information on visual and audible fault indicators.

5.3.2 The visual alarm indicator shall be fitted and shall be coloured red.

5.3.3 The visual fault indicator shall be fitted and shall be yellow.

5.3.4 The visual indicators shall be marked to show their function. Alternatively the function of the visual indicator may be marked somewhere else on the apparatus.

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5.3.5 The visual indicators shall be visible when the apparatus is installed in its operating position according to the manufacturer's instructions.

5.4 Alarms

5.4.1 The apparatus shall have an audible alarm, see 6.3.16.

5.4.2 The visual alarm indicator and audible alarm shall operate simultaneously at the set points as listed in Table 2.

5.4.3 An audible alarm shall have a continuous temporal pattern with no silent period greater than 6 s.

5.4.4 The red visual indicators shall flash continuously or in sync with the temporal pattern.

5.4.5 Once activated, the alarm shall remain in operation until the carbon monoxide concentration has reduced to below 50 ppm, unless silenced manually by the user.

Table 2 — Alarm conditions

CO concentration	Without alarm before	With alarm before
30 ppm	120 min	-
50 ppm	60 min	90 min
100 ppm	10 min	40 min
300 ppm	-	3 min

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5.5 End-of-life

5.5.1 General

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The end-of-life indicator shall be activated at a point that is determined either by prediction or inbuilt testing.

The manufacturer shall determine the minimum length of time, either by prediction or extended stability testing, until the application of test gas C would fail the requirements of Table 5.

5.5.2 Prediction of end-of-life

Where the apparatus utilizes the battery voltage to determine end-of-life, the manufacturer shall supply calculations of worst-case current consumption, worst-case battery capacity, typical duty-cycle, likely temperature excursions and sensor data to ensure that the operating lifetime of the battery does not exceed the lifetime of any other components including the sensor.

Where the apparatus utilizes the battery low voltage to determine end-of-life, the battery shall be tamperproof and it shall not be possible to remove it without the use of a tool.

The manufacturer shall submit to the test house, and retain evidence of, the methodology and any supporting calculations which have been used to predict the end-of-life.

NOTE 1 The end-of-life prediction evidence would normally include data from accelerated and other tests for example showing:

— adequate immunity to interference gases and potential contaminants;

— adequate immunity to leaking due to accretion of moisture under high humidity conditions (electrochemical sensors only);

— adequate immunity to drying out due to loss of electrolyte (electrochemical sensors only);