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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

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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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13.320	Alarmni in opozorilni sistemi	Alarm and warning systems

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

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

To be completed

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This draft European Standard is submitted to CENELEC members for CENELEC enquiry.
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Comité Européen de Normalisation Electrotechnique
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Foreword

This document (prEN 50291-1:2014) has been prepared by Technical Committee CLC/TC 216, the secretariat of which is held by BSI.

This document is currently submitted to the CLC Enquiry.

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prEN 50291-1:2014 (E)**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 apparatus may be mains-powered or battery-powered. Such apparatus is intended to warn of an accumulation 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 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; and
- type B – to provide a visual and audible alarm only.

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; and
- CO measurement for smoke and fire detection.

2 Normative references

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<https://standards.iteh.ai/catalog/standards/sist/1a657f97-9288-43e2-9c8e-780cd576097a/sist-pr-en-50291-1-2014>

The following referenced documents are indispensable for the application 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 50270:2006, *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 50292:2001, *Electrical apparatus for the detection of carbon monoxide in domestic premises – 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)*

EN 60704-1:2010, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 1: General requirements (IEC 60407-1:1997)*

EN 300 200-1, *Electromagnetic compatibility and radio spectrum matters (ERM); Short range devices (SRD); Radio equipment to be used in the 25 mhz to 1 000 mhz frequency range with power levels ranging up to 500 mw; Part 1: Technical characteristics and test methods*

3 Terms and definitions

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

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**

assembly in which the sensing element is housed and which can contain associated circuit components

3.6**sensing element**

device, the output of which will change in the presence of carbon monoxide

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 point**

fixed setting of the apparatus that determines the volume ratio and duration of exposure at which the apparatus will automatically initiate an alarm and, for type A apparatus an transmittable output signal

3.11**fault warning**

visual and audible signal indicating a faulty or failed apparatus

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**

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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 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

[EN 13878:2003]

3.17**apparatus**

carbon monoxide detection device, which may also be generically termed "gas 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

3.18**end-of-life**

point in time where 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 is an absence of sound reflecting surfaces or radio frequency reflecting surfaces

4 Design requirements**4.1 General requirements**

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

4.1.2 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.

4.1.3 Apparatus which includes functionality additional to carbon monoxide detection shall perform according to the requirements of this European Standard and to the requirements of the applicable European Standard or equivalent relevant to the additional functionality.

4.1.4 The apparatus, electrical assemblies and components shall comply with the requirements of 4.2 to 4.8 and the performance requirements of Clause 5.

For apparatus utilising radio links, the requirements of Clause 6 shall be met.

Apparatus shall be designed for continuous operation.

The apparatus shall not be class 0 as defined in 3.3.7 of EN 60335-1:2002.

4.1.5 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 detector.

4.1.6 The apparatus shall indicate end-of-life as per 4.5.

4.1.7 The apparatus shall be provided with an installation and maintenance instruction booklet or leaflet meeting the requirements of Clause 7.

4.1.8 All adjustment devices and tools intended for adjustment of, or access to, such adjustment devices shall be designed so as to discourage unauthorised interference with the apparatus.

4.1.9 The manufacturer's means of calibration shall not be readily adjustable by the user...

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

4.1.11 Visual and audible indicators shall comply with the sequences in Annex C.

4.2 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 detector shall give an automatic signal of a fault and/or alarm. Moreover it shall be impossible or recognized as an error the connection of a sensor designed for a certain type of gas to a detector designed for a different type of gas.

Table 1 — Construction requirements

Constructional requirement	EN 60335-1:2012 (Sub)clause
Protection against accessibility to live parts	8
Heating	Relevant parts of 11
Leakage current and electrical 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
Creepage distances, clearances and distances through insulation	29
Resistance to heat and fire	30
Resistance to rusting	31

4.3 Visual indicators

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4.3.1 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.

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

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

4.3.4 The visual indicators shall be marked to show their function.

4.3.5 Where a visual indication consists of flashes at a rate greater than 5 s, the flashes shall be coincident with the audible signal.

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

4.4 Alarms

4.4.1 The apparatus shall have an audible alarm, see 5.3.16.

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

4.4.3 Once activated, the alarm shall remain in operation until the carbon monoxide concentration has dropped below 55 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

4.5 End-of-life

4.5.1 General

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

4.5.2 Prediction of end-of-life

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

Where the apparatus utilises the battery low 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 utilises 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 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);
- adequate stability subsequent to extended temperature cycling tests; and
- stability in long term tests in controlled conditions and field trials.

NOTE 2 The example extended stability testing in Annex A can be used to support lifetime predictions.

4.5.3 Inbuilt testing of end-of-life

The end-of-life is determined as the point in time when the application of test gas C or equivalent would fail the requirements of Table 3.

4.6 Fault warnings

4.6.1 The apparatus shall provide an audible and visible fault warning in the event of loss of continuity or short circuit to the sensor.

4.6.2 The audible fault warning shall be clearly identified and different from a gas alarm.

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4.6.3 The visual fault warning shall be as per 4.3.3.

4.6.4 The end-of-life indication shall utilise the visual fault warning. The end-of-life audible indication shall be clearly different from all other indications.

4.7 Alarm silence facility (optional)

4.7.1 The provision of a manually operated alarm silence button is optional.

4.7.2 The operation of the alarm silence button shall silence the audible alarm signal only.

4.7.3 The audible alarm signal shall reactivate within 15 minutes from the time the alarm silence button is operated where the concentration of carbon monoxide surrounding the alarm remains at 55 ppm CO or greater. Continuous operation of the alarm silence facility shall not lead to the apparatus being silenced for more than 15 min without the audible alarm being reactivated.

4.7.4 It shall not be possible to create a silent period unless the apparatus is already in the alarm condition.

4.7.5 It shall not be possible to silence the alarm at concentrations above 300 ppm.

4.7.6 The alarm silence button may be combined with the fault warning silence button (see 4.8) and the test button.

4.7.7 Remote silencing is permitted to only be activated in the room or corridor where the apparatus is located..

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4.8 Fault warning silence facility (standards.iteh.ai)

4.8.1 The provision of a manually operated fault warning silence button is optional.

4.8.2 The operation of the fault warning silence button shall silence the audible fault warning only.

4.8.3 The audible fault warning shall reactivate within 24 hours from the time the fault warning silence button is operated. Continuous operation of the fault warning silence facility shall not lead to the apparatus being silenced for more than 24 h without the audible fault warning being reactivated.

4.8.4 It shall not be possible to create a silent period unless it is already in the fault condition.

4.8.5 The fault warning silence button can be combined with the alarm silence button and the test button.

4.8.6 If the fault warning silence facility is activated, it shall not inhibit the audible alarm signal.

4.8.7 Remote silencing is permitted to only be activated in the room or corridor where the apparatus is located.

4.9 Transmittable output signal (applicable for type A apparatus only)

The type A apparatus shall provide a transmittable output signal at each of the alarm conditions listed in Table 2.

Open-circuit or short-circuit failure of the transmittable output signal shall not prevent the correct operation of the apparatus.

The transmittable output signal shall be tested per 5.3.3.

4.10 Software-controlled apparatus

The apparatus shall fulfil the requirements of EN 50271:2010.

4.11 Labelling

4.11.1 All text on the apparatus shall be in accordance with national regulations.

4.11.2 The apparatus shall carry durable label(s) carrying the following information:

- a) the manufacturer's or supplier's name, trademark or other means of identification;
- b) the name of apparatus, model number (if any) and the type of gas to be detected;
- c) the number of this European Standard;
- d) the type of apparatus, A or B;
- e) the serial number or manufacturing date code of the apparatus;
- f) for mains-powered apparatus the electricity supply voltage and frequency and maximum power consumption;
- g) for battery-powered apparatus the type and size of replacement batteries; and
- h) the apparatus replacement date.

4.11.3 The markings b) and h) shall be clearly visible with the apparatus in a typical installed position.

4.11.4 Where the sensor is replaceable, the apparatus shall carry the next replacement date of the sensor that shall be clearly visible with the apparatus in a typical installed position. This data shall be updated in the apparatus at each revision or replacement of the sensor, with the new date given by the manufacturer. If the updating procedure provides the application of a pre-printed label, this shall be supplied with the new sensor with a warning to replace the previous label attached to the detector with the new one: Every sensor shall be provided with a marking which allows traceability of the manufacturing and calibration information of each single sensor (e.g. serial number, manufacturing batch/production date, expected lifetime of the apparatus, etc.).

4.11.5 The markings shall be legible and durable. When symbols are used, they shall comply with 7.6 of EN 60335-1:2012.

4.11.6 The apparatus shall carry a caution, on a label attached to the apparatus, giving the following or equivalent information:

CAUTION: READ THE INSTRUCTIONS CAREFULLY
BEFORE OPERATING OR SERVICING.

4.12 Requirements for the use of batteries

4.12.1 Battery low voltage warning

Battery-powered apparatus shall give a fault visual indicator per 4.3.3 and a coincident audible fault warning before a decrease in the performance of the battery prevents correct operation of the apparatus. This shall not inhibit the alarm condition.

The battery low voltage warning shall be indicated by: