BRITISH STANDARD

BS EN
50056:1999

Electrical apparatus for the detection and measurement of combustible gases — Performance requirements for Group I apparatus indicating up to 100 % (*V/V*) methane in air

The European Standard EN 50056:1998 has the status of a British Standard

ICS 13.320

National foreword

This British Standard is the English language version of EN 50056:1998. It supersedes BS EN 50056:1991.

The 1998 edition of the European Standard incorporates some minor modifications to bring it into alignment with the New Approach Directive on Potentially Explosive Atmospheres (ATEX). There are no changes to the technical provisions.

The UK participation in its preparation was entrusted by Technical Committee GEL/31, Electrical apparatus for explosive atmospheres, to Subcommittee GEL/31/19, Gas detectors, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

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English version

Electrical apparatus for the detection and measurement of combustible gases — Performance requirements for Group I apparatus indicating up to 100 % (*V/V*) methane in air

Appareils électriques de détections et de mesure des gaz combustibles — Règles de performances des appareils du Groupe I pouvant indiquer jusqu'à 100 % (*V/V*) de méthane dans l'air

Elektrische Geräte für das Aufspüren und die Messung brennbarer Gase — Anforderungen an das Betriebsverhalten von Geräten der Gruppe I mit einem Meßbereich bis zu 100 % (*V/V*) Methan in Luft

This European Standard was approved by CENELEC on 12 September 1996.

CENELEC

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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

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Foreword

This second edition of the European Standard was prepared by SC 31- 9, Electrical apparatus for the detection and measurement of combustible gases, to be used in industrial and commercial potentially explosive atmospheres, of Technical Committee CENELEC TC 31, Electrical apparatus for explosive atmospheres, on the basis of EN 50056:1991, its amendment A1:1995 and a second amendment.

This second amendment was approved by CENELEC on 1996-12-09 for incorporation into a new edition of EN 50056.

This European Standard replaces EN 50056:1991 + A1:1995.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1999-01-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1999-01-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and covers essential requirements of EC Directive 94/9/EC.

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1 Scope

1.1 This European Standard specifies performance requirements for Group I (as defined in EN 50054) portable, transportable and fixed apparatus for the detection and measurement of methane concentrations in mine air. The apparatus, or parts thereof, are intended for use in mines susceptible to firedamp and shall meet the general requirements and test methods specified in EN 50054.

1.2 This European Standard is restricted to apparatus intended for the detection and measurement of volume ratios of methane in air from 0 % (*V/V*) up to 100 % (*V/V*).

NOTE Apparatus covered by this European Standard will normally be intended to operate in volume ratios greater than 5 % (*V/V*).

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to the European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 50054:1998, *Electrical apparatus for the detection and measurement of combustible gases — General requirements and test methods.*

3 Definitions

For the purposes of this European Standard, the definitions given in EN 50054 apply.

4 General requirements

The apparatus shall comply with the general requirements specified in clause **4** of EN 50054.

5 Performance requirements

5.1 General

The normal conditions for test are specified in subclause **5.3** of EN 50054. Compliance shall be determined in accordance with the test methods specified in subclause **5.4** of EN 50054.

5.2 Unpowered storage

After being submitted to the conditions specified in subclause **5.4.2** of EN 50054, the apparatus shall meet the requirements specified in **5.3** to **5.25** of this European Standard.

5.3 Calibration curve (not applicable to alarm-only apparatus)

Each of the three indications (after correction using the manufacturer's calibration curve, if necessary) obtained for each of the four gas volume ratios shall not differ from these volume ratios by more than ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater.

5.4 Drift (continuous duty apparatus)

The medium term variation shall not exceed ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater, in air and in the standard test gas.

5.5 Drift (spot reading apparatus)

The variation of the indication shall not exceed ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater, in air and in the standard test gas.

5.6 Alarm

The alarm shall operate during every cycle of the test. If a latching alarm is provided, the manual reset action shall be checked during every cycle.

5.7 Temperature

The variation of the indication from that at 20 °C, over the temperature range:

a) −10 °C to 0 °C, shall not exceed ± 7 % (*V/V*) methane or ± 15 % of the indication; and

b) 0 °C to + 40 °C, shall not exceed ± 5 % (*V/V*) methane or ± 10 % of the indication.

whichever is the greater.

5.8 Pressure

The variation of the indication from that at 101,3 kPa, over a pressure range of 92 kPa to 115 kPa, shall not exceed ± 7,5 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater.

5.9 Humidity

At 40 °C, the variation of the indication from that at 55 % relative humidity (r.h.) over a humidity range of 5 % r.h. to 90 % r.h., shall not exceed ± 5 % (*V/V*) methane or ± 10 % of the indication, whichever is the greater.

5.10 Air speed

The variation of the indication over a range of air speeds from 0 m/s to 6 m/s shall not exceed ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater.

5.11 Pumping rate

The variation of the indication shall not exceed ± 3 % (*V/V*) methane or 5 % of the variation, whichever is the greater.

5.12 Orientation

5.12.1 *Portable apparatus*

The variation in the indication shall not exceed ± 5 % (*V/V*) methane or ± 10 % of the indication, whichever is the greater.

5.12.2 *Fixed and transportable apparatus*

The variation in the indication shall not exceed ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater.

5.13 Vibration (applicable only to machine-mounted apparatus)

During the vibration test, the apparatus shall not suffer any loss of function and shall not give a false alarm or fault signal. The apparatus shall not suffer damage resulting in hazard or loss of function.

At the conclusion of the vibration test and after the apparatus sensor has then been exposed to clean air followed by the standard test gas, the variation of the indication from that determined prior to the test shall not exceed ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater.

5.14 Drop test (applicable to portable apparatus and remote sensors)

The apparatus shall not suffer damage resulting in hazard or loss of function.

The variation of the indication shall not exceed + 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater.

5.15 Warm-up time (not applicable to spot-reading apparatus)

5.15.1 ***Fixed and transportable apparatus***

The apparatus shall warm-up in clean air to indicate zero to within ± 3 % (*V/V*) methane, in a time not exceeding 5 min, or longer if specified by the manufacturer. The apparatus shall warm-up in the standard test gas to give a final indication to within ± 3 % (*V/V*) methane in a time not exceeding 5 min, or longer if specified by the manufacturer.

5.15.2 ***Continuous duty portable apparatus***

The apparatus shall warm-up in clean air to indicate zero to within ± 3 % (*V/V*) methane in a time not exceeding 60 s. The apparatus shall warm-up in the standard test gas to give a final indication to within ± 3 % (*V/V*) methane in a time not exceeding 60 s.

5.16 Time of response (not applicable to spot-reading apparatus)

The time of response t_{50} shall not be greater than 10 s, and t_{90} shall not be greater than 30 s.

The specified times of response shall apply to apparatus in the as-supplied condition and without optional accessories attached to the sensors for special purposes, e.g. collecting cones, weather protection.

5.17 Minimum time of operation (spot reading apparatus)

For apparatus without probe or sample line, the indication shall reach 90 % of the final value in a time not exceeding 15 s.

For aspirated apparatus using a sample line or probe length of not more than 3 m, an additional 10 s is permitted.

5.18 High gas concentration above the measuring range

Not applicable.

5.19 Battery capacity

5.19.1 ***Battery powered portable continuous duty apparatus***

The variation shall not exceed ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater, at the end of the 8 h or 10 h period as appropriate.

At the end of the further 15 min following the indication of low battery condition, the variation shall not exceed ± 6 % (*V/V*) methane or ± 10 % of the indication, whichever is the greater.

5.19.2 ***Battery-powered portable spot-reading apparatus***

The variation shall not exceed ± 3 % (*V/V*) methane, or ± 5 % of the indication, whichever is the greater, at the end of 200 operations.

After a further 10 operations following the indication of low battery condition, the variation shall not exceed ± 6 % (*V/V*) methane or ± 10 % of the indication, whichever is the greater.

5.20 Power supply variations

5.20.1 ***A.C. powered apparatus***

The variation of the indication shall not exceed ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater.

5.20.2 ***External d.c. powered apparatus***

The variation of the indication shall not exceed ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater.

5.20.3 ***Battery powered apparatus***

The variation of the indication shall not exceed ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater, when the apparatus is subjected to a change from the maximum terminal voltage of a new or fully charged battery to the minimum recommended operating voltage of that battery as determined by the built-in battery condition indicator.

For spot reading apparatus, it shall be possible to carry out at least 10 measurements at the minimum operating voltage within the above stated tolerances.

5.21 Power supply interruptions, voltage transients and step changes of voltage

The apparatus shall not yield spurious alarms when the specified interruption, voltage transient or step changes of voltage occurs.

5.22 Addition of sampling probe

The addition of a sampling probe shall not introduce a variation of the indication exceeding ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is greater.

5.23 Dust

The functioning of the apparatus shall not be impaired by dust.

For apparatus where the atmosphere is sampled by diffusion, a 50 % reduction of the cross-sectional area of the apparatus inlet shall not produce a variation of indication exceeding ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater.

5.24 Poisons and other gases

5.24.1 ***Poisons***

Not applicable.

5.24.2 ***Other gases***

The variation of the indication shall not exceed ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater.

5.25 Electromagnetic immunity

When subjected to the electromagnetic immunity test, the variation of the indication shall not exceed ± 3 % (*V/V*) methane or ± 5 % of the indication, whichever is the greater. The apparatus shall suffer no loss of function nor spurious alarm.

6 Field calibration kit

The meter or output indication observed during the use of the field calibration kit in a manner corresponding to the manufacturer's instruction, shall not differ from the correct indication by more than ± 5 % of the measuring range.

7 Information for use

It shall be verified that the contents of the instruction manual are in accordance with the requirements specified in EN 50054.

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