

INTERNATIONAL STANDARD

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**Electrical apparatus for the detection
and measurement of flammable gases –
Part 3:
Performance requirements for group I apparatus
indicating a volume fraction up to 100 %
methane in air**

*Appareils électriques de détection et de mesure
des gaz combustibles –*

*Partie 3:
Règles de performance des appareils du groupe I pouvant indiquer
une fraction volumique jusqu'à 100 % de méthane dans l'air*

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For graphical symbols, and letter symbols and signs approved by the IEC for general use, readers are referred to publications IEC 60027: *Letter symbols to be used in electrical technology*, IEC 60417: *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets* and IEC 60617: *Graphical symbols for diagrams*.

* See web site address on title page.

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International Electrotechnical Commission
Telefax: +41 22 919 0300

3, rue de Varembeé Geneva, Switzerland
e-mail: inmail@iec.ch IEC web site <http://www.iec.ch>



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL APPARATUS FOR THE DETECTION
AND MEASUREMENT OF FLAMMABLE GASES –**

**Part 3: Performance requirements for group I apparatus
indicating a volume fraction up to 100 % methane in air**

FOREWORD

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International Standard IEC 61779-3 has been prepared by subcommittee 31L: Electrical apparatus for the detection of flammable gases, of IEC technical committee 31: Electrical apparatus for explosive atmospheres.

This standard should be read in conjunction with IEC 61779-1.

The text of this standard is based on the following documents:

FDIS	Report on voting
31L/49/FDIS	31L/54/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

A bilingual version of this standard may be issued at a later date.

ELECTRICAL APPARATUS FOR THE DETECTION AND MEASUREMENT OF FLAMMABLE GASES –

Part 3: Performance requirements for group I apparatus indicating a volume fraction up to 100 % methane in air

1 Scope

1.1 This part of IEC 61779 specifies requirements for group I (as defined in part 1) 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. The requirements and test methods applicable to the apparatus covered by this standard are specified in part 1.

NOTE — The use of group I apparatus may not be permitted without the additional and prior approval of the relevant authority in mines under its jurisdiction, see note 1 of 1.1.1 of part 1.

1.2 This standard is restricted to apparatus intended for the detection and measurement of volume ratios of methane in air from a volume fraction of 0 % up to a volume fraction of 100 %.

NOTE — Apparatus covered by this standard will normally be intended to operate in volume ratios greater than a volume fraction of 5 %.

2 Definitions

For the purpose of this part of IEC 61779, the definitions given in part 1 apply.

3 General requirements

The apparatus shall comply with the general requirements specified in part 1 and with the performance requirements specified in clause 4 below.

Compliance shall be determined in accordance with the appropriate test requirements and methods, including initial calibration, specified in part 1.

It shall be verified that the contents of the manufacturer's instruction manual are in accordance with the requirements specified in part 1.

4 Performance requirements

4.1 General

The normal conditions for tests are specified in 4.3 of part 1. Compliance shall be determined in accordance with the test methods specified in 4.4 of part 1.

4.2 Unpowered storage

After being submitted to the conditions specified in 4.4.2 of part 1, the apparatus shall meet the requirements specified in 4.3 to clause 5 of this standard.

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

After initial adjustment with the standard test gas, each individual indication in the three sets of 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 a volume fraction of $\pm 3\%$ methane or $\pm 5\%$ of the indication, whichever is the greater.

4.4 Stability (continuous duty apparatus)

Continuous duty apparatus shall comply with the following requirements:

a) short-term stability

The short-term variation shall not exceed a volume fraction of $\pm 3\%$ methane or $\pm 5\%$ of the indication, whichever is the greater.

b) long-term stability (fixed and transportable apparatus)

The long-term variation shall not exceed a volume fraction of $\pm 3\%$ methane or $\pm 5\%$ of the indication, whichever is the greater.

c) long-term stability (portable apparatus)

The long-term variation shall not exceed a volume fraction of $\pm 3\%$ methane or $\pm 5\%$ of the indication, whichever is the greater.

4.5 Stability (spot-reading apparatus)

The variation shall not exceed a volume fraction of $\pm 3\%$ methane or $\pm 5\%$ of the indication, whichever is the greater.

4.6 Alarm

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

4.7 Temperature

The variation of the indication from that at $20\text{ }^{\circ}\text{C}$

- a) shall not, at $-10\text{ }^{\circ}\text{C}$, exceed a volume fraction of $\pm 7\%$ methane or $\pm 15\%$ of the indication, and
- b) shall not, at $+40\text{ }^{\circ}\text{C}$, exceed a volume fraction of $\pm 5\%$ methane or $\pm 10\%$ of the indication, whichever is the greater.

Tests shall be carried out at temperatures of $-10\text{ }^{\circ}\text{C}$, $20\text{ }^{\circ}\text{C}$ and $40\text{ }^{\circ}\text{C}$.

4.8 Pressure

The variation of the indications at 80 kPa and 120 kPa from the indication at 100 kPa shall not exceed a volume fraction of $\pm 5\%$ methane or $\pm 30\%$ of the indication, whichever is the greater, in air and in the standard test gas.

4.9 Humidity

The variation of the indications at 20% RH and 90% RH from the indication at 50% RH, at $+40\text{ }^{\circ}\text{C}$, shall not exceed a volume fraction of $\pm 5\%$ methane or $\pm 10\%$ of the indication, whichever is the greater.

4.10 Air velocity

The variation of the indication shall not exceed a volume fraction of $\pm 3\%$ methane or $\pm 5\%$ of the indication, whichever is the greater.