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Standards

Irish Standard  
I.S. EN 50104:2010

# Electrical apparatus for the detection and measurement of oxygen - Performance requirements and test methods

## I.S. EN 50104:2010

*Incorporating amendments/corrigenda issued since publication:*

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**EUROPEAN STANDARD**  
**NORME EUROPÉENNE**  
**EUROPÄISCHE NORM**

**EN 50104**

June 2010

ICS 13.320

Supersedes EN 50104:2002 + A1:2004

English version

**Electrical apparatus for the detection and measurement of oxygen -  
Performance requirements and test methods**

Appareils électriques de détection  
et de mesure de l'oxygène -  
Règles de performance et méthodes  
d'essai

Elektrische Geräte für die Detektion  
und Messung von Sauerstoff -  
Anforderungen an das Betriebsverhalten  
und Prüfverfahren

This European Standard was approved by CENELEC on 2010-06-01. CENELEC 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

**I.S. EN 50104:2010**

EN 50104:2010

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**Foreword**

This 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 potentially explosive atmospheres, on the basis of EN 50104:2002. It was submitted to the Unique Acceptance Procedure and approved by CENELEC as EN 50271 on 2010-06-01.

This document supersedes EN 50104:2002 + A1:2004.

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

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) 2011-06-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2013-06-01

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

The State of the Art is included in Annex ZY “*Significant changes between this European Standard and EN 50104:2002*”.

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## 1 Scope

This European Standard specifies general requirements for construction, testing and performance, and describes the test methods that apply to portable, transportable and fixed apparatus for the measurement of the oxygen concentration in gas mixtures indicating up to 25 % (v/v). The apparatus, or parts thereof, may be intended for use in potentially explosive atmospheres (see 4.1) and in mines susceptible to firedamp.

In the case of inert gas purging (inertization), it applies also to apparatus with an oxygen measuring function for explosion protection.

NOTE Commonly used oxygen sensors in commercial equipment for industrial application are:

- a) paramagnetic sensors;
- b) electrochemical sensors (aqueous and solid electrolytes);
- c) tunable diode laser absorption spectroscopy sensors (TDLAS).

This standard is also applicable when an apparatus manufacturer makes any claims regarding any special features of construction or superior performance that exceed the minimum requirements of this standard. All such claims shall be verified and the test procedures shall be extended or supplemented, where necessary, to verify the claimed performance. The additional tests shall be agreed between the manufacturer and test laboratory and identified and described in the test report.

This European Standard is applicable to oxygen alarm apparatus intended to measure reliably the oxygen concentration, to provide an indication, alarm or other output function, the purpose of which is to give a warning of a potential hazard and, in some cases, to initiate automatic or manual protective action(s), whenever the level exceeds or falls below a preselected alarm concentration.

This standard is applicable to apparatus, including integral sampling systems of aspirated apparatus, intended to be used for commercial, industrial and non-residential safety applications.

This standard does not apply to external sampling systems, or to apparatus of laboratory or scientific type, or to medical equipment, or to apparatus used only for process control purposes. For apparatus used for sensing the presence of multiple gases, this standard applies only to the measurement of oxygen.

This standard is also applicable to apparatus using optical principles (e.g. TDLAS), where the optical transmitter and receiver or the optical transceiver (i.e. combined transmitter and receiver) and a suitable reflector are not located in a common enclosure. However, in this case it will be necessary to modify the test conditions described in Clause 5 and to introduce supplementary tests to Clause 6 of this standard. Such supplementary tests will include alignment, beam block fault, long range operation. Guidance to appropriate modification of the test conditions and supplementary tests may be taken from EN 60079-29-4. Modifications of the test conditions as well as modified and supplementary tests shall be agreed between the manufacturer and test laboratory and identified and described in the test report.

## 2 Normative references

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	Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen
EN 50271	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 60079-0	Explosive atmospheres - Part 0: Equipment - General requirements (IEC 60079-0)
EN 60079-29-4	Explosive atmospheres - Part 29-4: Gas detectors - Performance requirements of open path detectors for flammable gases (IEC 60079-29-4)

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