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Interested committees:

Title: Draft BS EN IEC 62990-3 Workplace atmospheres. Part 3: Gas detectors - Electrical apparatus for the detection and measurement of oxygen - Performance requirements and test methods.

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- ii) affects other national standard(s)
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Introduction

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For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



31/1444/CD

COMMITTEE DRAFT (CD)

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SUPERSEDES DOCUMENTS:

31/1387/NP,31/1426A/RVN

IEC TC 31 : EQUIPMENT FOR EXPLOSIVE ATMOSPHERES

SECRETARIAT:

United Kingdom

SECRETARY:

Mr Mick Maghar

OF INTEREST TO THE FOLLOWING COMMITTEES:

PROPOSED HORIZONTAL STANDARD:



Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☐ SAFETY

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TITLE:

Workplace atmospheres – Part 3: Gas detectors - Electrical apparatus for the detection and measurement of oxygen - Performance requirements and test methods

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

WORKPLACE ATMOSPHERES –

**Part 3: Gas detectors - Electrical apparatus for the detection and measurement of oxygen -
Performance requirements and test methods**

FOREWORD

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- International Standard IEC 62990-3 has been prepared by subcommittee TC31: Explosive Atmospheres, of IEC technical committee MT60079-29 and JWG45.

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

FDIS	Report on voting
XX/XX/FDIS	XX/XX/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.

- 131 This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.
- 132 The committee has decided that the contents of this publication will remain unchanged until
- 133 the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data
- 134 related to the specific publication. At this date, the publication will be
- 135 • reconfirmed,
 - 136 • withdrawn,
 - 137 • replaced by a revised edition, or
 - 138 • amended.
- 139

140 The National Committees are requested to note that for this publication the stability date

141 is 2024.

142 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED

143 AT THE PUBLICATION STAGE.

144

INTRODUCTION

WORKPLACE ATMOSPHERES –

Part 3: Gas detectors - Electrical apparatus for the detection and measurement of oxygen - Performance requirements and test methods

1 Scope

This International 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.

This standard applies to equipment intended for monitoring oxygen deficiency and enrichment.

EXAMPLE 1 Monitoring oxygen deficiency and/or enrichment includes:

- protection of human health and safety in potentially oxygen deficient atmospheres;
- fire protection by monitoring areas with reduced oxygen concentration;
- fire protection by monitoring oxygen concentrations exceeding that of normal ambient air.

This standard also applies to equipment with an oxygen measuring function for explosion protection in the case of monitoring inertisation.

NOTE 1 Inertisation is an explosion protection technique where a potentially explosive atmosphere is purged with inert gas.

NOTE 2 Commonly used oxygen sensors in commercial equipment for industrial application are:

- electrochemical sensors (aqueous and solid electrolytes);
- paramagnetic sensors;
- zirconium dioxide sensors;
- tunable diode laser absorption spectroscopy sensors (TDLAS).

This standard is applicable to equipment 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 an alarm set point.

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

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

This standard is also applicable to equipment 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 5.3 and to introduce supplementary tests to clause 5.4 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.

IEC 60079-0	Explosive atmospheres - Part 0: Equipment - General requirements
IEC 60068-2-6	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)
IEC 60079-29-2	Explosive atmospheres - Part 29-2: Gas detectors - Selection, installation, use and maintenance of detectors for flammable gases and oxygen
IEC 60079-29-4	Explosive atmospheres - Part 29-4: Gas detectors - Performance requirements of open path detectors for flammable gases
IEC 60529	Degrees of protection provided by enclosures (IP Code)

3 Definitions

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

3.1 Gas properties

3.1.1

ambient air

normal atmosphere surrounding the apparatus

3.1.2

poisons (for sensors)

substances which lead to temporary or permanent loss of sensitivity of the sensors

3.1.3

reference air

air, under normal ambient conditions, with an oxygen concentration of $(21 \pm 0,4) \%$ (v/v)

3.1.4

standard test gas

test gas with a composition specified for each apparatus to be used for all tests unless otherwise stated (see 5.3.2)

3.1.5

volume fraction (v/v)

quotient of the volume of a specified component and the sum of the volumes of all components of a gas mixture before mixing, all volumes referring to the pressure and the temperature of the gas mixture

NOTE The volume fraction and volume concentration take the same value if, at the same state conditions, the sum of the component volumes before mixing and the volume of the mixture are equal. However, because the mixing of two or more gases

226 at the same state conditions is usually accompanied by a slight contraction or, less frequently, a slight expansion, this is not
227 generally the case.

228 **3.1.6**

229 **zero test gas**

230 gas, such as nitrogen, which is free of oxygen, and interfering and contaminating substances

231

232 **3.2 Types of apparatus**

233 **3.2.1**

234 **alarm-only apparatus**

235 apparatus having an alarm but not having a meter or other indicating device

236 **3.2.2**

237 **aspirated apparatus**

238 apparatus that samples the gas by drawing it to the gas sensor, for example, by means of a
239 hand-operated or electric pump

240 **3.2.3**

241 **automatically aspirated apparatus**

242 aspirated apparatus with an integral pump

243 **3.2.4**

244 **continuous duty apparatus**

245 apparatus that is powered for long periods of time, but may have either continuous or
246 intermittent sensing

247 **3.2.5**

248 **diffusion apparatus**

249 apparatus in which the transfer of gas from the atmosphere to the gas sensor takes place by
250 random molecular movement, i.e. under conditions in which there is not aspirated flow

251 **fixed apparatus**

252 apparatus that is intended to have all parts permanently installed

253 **3.2.6**

254 **portable apparatus**

255 apparatus that has been designed to be carried readily from place to place and to be used
256 while it is being carried. A portable apparatus is battery powered and includes, but is not
257 limited to

258 a) a hand-held apparatus, typically less than 1 kg, suitable for one-handed operation
259 without accessories (such as sampling probes, sample lines) fitted,

260 b) personal monitors, similar in size and mass to the hand-held apparatus, that are
261 continuously operating (but not necessarily continuously sensing) while they are attached to
262 the user, and

263 c) another apparatus that can be operated by the user while it is carried either by hand, by
264 a shoulder strap or carrying harness, and which may or may not have a hand-directed probe

265 **3.2.7**

266 **spot-reading apparatus**

267 apparatus intended to be used for short, intermittent or irregular periods of time as required
268 (typically 5 min or less)

269 **3.2.8**

270 **transportable apparatus**

271 apparatus not intended to be portable, but which can be readily moved from one place to
272 another

273 **3.2.9**
274 **stand-alone gas detection apparatus**
275 fixed gas detection apparatus that provide a conditioned electronic signal or output indication
276 to a generally accepted industry standard (such as 4-20 mA), intended to be utilized with
277 stand-alone control units, or signal processing data acquisition, central monitoring and similar
278 systems which typically process information from various locations and sources including, but
279 not limited to, gas detection apparatus

280 **3.2.10**
281 **stand-alone control unit**
282 fixed gas detection control units intended to provide meter indication, alarm functions, output
283 contacts and/or alarm signal outputs when utilized with stand-alone gas detection apparatus

284 **3.3 Sensors**

285 **3.3.1**
286 **integral sensor**
287 sensor which is integral to the main body of the apparatus

288 **3.3.2**
289 **measuring principle**
290 type of physical or physico-chemical detection principle and the measurement procedure to
291 determine the measured value

292 **3.3.3**
293 **remote sensor**
294 sensor which is not integral to the main body of the apparatus

295 **3.3.4**
296 **sensing element**
297 part of the sensor which directly picks up the quantity to be measured and which is sensitive
298 to that quantity

299 **3.3.5**
300 **sensor**
301 assembly in which the sensing element is housed and which may also contain associated
302 circuit components

303 **3.4 Supply of gas to apparatus**

304 **3.4.1**
305 **sample line**
306 a means by which the gas being sampled is conveyed to the sensor including accessories,
307 e.g. filter, water trap

308 **3.4.2**
309 **sampling probe**
310 separate sample line which is attached to the apparatus as required, that may or may not be
311 supplied with the apparatus. It is usually short (e.g. in the order of 1 m) and rigid (although it
312 may be telescopic), but it may be connected by a flexible tube to the apparatus

313 **3.5 Signals and alarms**

314 **3.5.1**
315 **alarm set point**
316 fixed or adjustable setting of the apparatus that is intended to pre-set the level of
317 concentration at which the apparatus will automatically initiate an indication, alarm or other
318 output function

319 **3.5.2**
320 **fault signal**
321 audible, visible or other type of output, different from the alarm signal, permitting, directly or
322 indirectly, a warning or indication that the apparatus is not working satisfactorily

3.5.3**latching alarm**

alarm that, once activated, requires deliberate action to be deactivated

3.5.4**repeatability**

closeness of agreement between the results of successive measurements of the same value of the same quantity carried out by the same method, with the same measuring instruments, by the same observer, in the same laboratory at quite short intervals of time in unchanged conditions

3.6 Times**3.6.1****drift**

variation in the apparatus indication with time, at any fixed gas volume fraction under constant ambient conditions

3.6.2**final indication**

indication given by the apparatus after stabilisation

3.6.3**stabilisation**

state when three successive readings of an apparatus, taken at 2 min intervals, indicate no changes greater than $\pm 1\%$ of the measuring range

3.6.4**time of response t_x (not applicable to spot-reading apparatus)**

time interval, with the apparatus in a warmed-up condition, between the time when an instantaneous variation in volume fraction is produced at the apparatus inlet and the time when the response reaches a stated percentage (x) of the difference between the initial and the final indication

3.6.5**minimum time to operate (spot-reading apparatus)**

time interval between the initiation of a measurement procedure and the time when the apparatus indication reaches a stated percentage of the final indication

3.6.6**warm-up time (not applicable to spot-reading apparatus)**

time interval, with the apparatus in a stated atmosphere, between the time when the apparatus is switched on and the time when the indication reaches and remains within the stated tolerances (see Figure 1)

