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**Elektromagnetna združljivost - Električne naprave za odkrivanje in merjenje vnetljivih plinov, strupenih plinov ali kisika**

Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen

Elektromagnetische Verträglichkeit - Elektrische Geräte für die Detektion und Messung von brennbaren Gasen, toxischen Gasen oder Sauerstoff

Compatibilité électromagnétique - Appareils de détection et de mesure de gaz combustible, de gaz toxique et d'oxygène

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**Ta slovenski standard je istoveten z: EN 50270:1999**

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**ICS:**

13.320	Alarmni in opozorilni sistemi	Alarm and warning systems
33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general

**SIST EN 50270:2000****en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 50270**

April 1999

ICS 13.230; 19.080; 33.100

English version

**Electromagnetic compatibility  
Electrical apparatus for the detection and  
measurement of combustible gases, toxic gases or oxygen**

Compatibilité électromagnétique  
Appareils de détection et de mesure  
de gaz combustible, de gaz toxique  
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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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CENELEC**

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

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

### 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 explosive atmospheres.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50270 on 1998-10-01.

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 amendment (dop) 1999-10-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1999-10-01

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## 1 Scope

This European Standard specifies requirements for the electromagnetic compatibility (EMC) for electrical apparatus for the detection and measurement of combustible gases, toxic<sup>1</sup> gases or oxygen. This standard applies to apparatus intended for use in the residential, commercial and light-industrial environment as well as to apparatus intended for use in the industrial environment. The apparatus may be a.c.-, d.c.- or battery powered.

This European Standard is also applicable to apparatus which is intended for use in hazardous areas which may contain explosive or potentially explosive atmospheres.

This standard specifies requirements for immunity tests in relation to continuous and transient, conducted and radiated disturbances including electrostatic discharges and also for emission tests. The requirements are specified for each considered port.

These requirements have been selected so as to ensure an adequate level of compatibility for apparatus at the appropriate locations. The levels do not however cover extreme cases which may occur in any location but with an extremely low probability of occurrence.

NOTE: In special cases situations will arise where the level of disturbance may exceed the levels specified in this standard, e.g. where an apparatus is installed in proximity to industrial, scientific or medical (ISM) equipment as specified in EN 55011 or where a hand-held transmitter is used in close proximity to an apparatus. In these instances special mitigation measures may have to be employed.

Apparatus falling within the scope of this European Standard is classified as follows by the following types.

Type 1: apparatus intended for use in the residential, commercial and light-industrial environment, as described in EN 50081-1 and EN 50082-1.

Type 2: apparatus intended for use in the industrial environment, as described in EN 50081-2 and EN 50082-2.

This European Standard does not apply to any of the following:

- apparatus intended for the detection of dusts or mists in air;
- scientific or laboratory based apparatus used only for analysis or measurement;
- apparatus used exclusively for process measurement purposes;
- apparatus for medical purposes;
- apparatus intended for the direct measurement of automotive exhaust gases.

## 2 Normative references

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the 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 this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

prEN 45544	Workplace atmospheres - Electrical apparatus used for direct detection and direct concentration measurement of toxic gases and vapours
EN 50020	Electrical apparatus for potentially explosive atmospheres Intrinsic safety 'i'
EN 50054	Electrical apparatus for the detection and measurement of combustible gases

<sup>1</sup> The word 'toxic' is used in accordance with its dictionary definition and includes 'harmful', 'toxic' and 'very toxic' meanings.

EN 50081-1	Electromagnetic compatibility - Generic emission standard Part 1: Residential, commercial and light industry
EN 50081-2	Electromagnetic compatibility - Generic emission standard Part 2: Industrial environment
EN 50082-1	Electromagnetic compatibility - Generic immunity standard Part 1: Residential, commercial and light industry
EN 50082-2	Electromagnetic compatibility - Generic immunity standard Part 2: Industrial environment
EN 50104	Electrical apparatus for the detection and measurement of oxygen - Performance requirements and test methods
prEN 50194	Electrical apparatus for the detection of combustible gases in domestic premises
ENV 50204	Radiated electromagnetic field from digital radio telephones - Immunity test
EN 50241	Specification for open path apparatus for the detection of combustible or toxic gases and vapours
EN 55011	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment
EN 61000	Electromagnetic compatibility (EMC)
EN 61000-4	Part 4: Testing and measuring techniques
EN 61000-4-2	Section 2: Electrostatic discharge requirements
EN 61000-4-3	Section 3: Radiated radio frequency electromagnetic field immunity test
EN 61000-4-4	Section 4: Electrical fast transient/burst requirements
EN 61000-4-5	Section 5: Surge immunity test
EN 61000-4-6	Section 6: Immunity to conducted disturbances, induced by radio frequency fields
EN 61000-4-8	Section 8: Power-frequency magnetic field immunity test
EN 61000-4-11	Section 11: Voltage dips, short interruptions and voltage variations
IEC 60050(161)	International Electrotechnical Vocabulary Chapter 161: Electromagnetic compatibility

### 3 Definitions

Definitions related to EMC and to relevant phenomena may be found in the EEC Directive (89/336/EEC), in chapter 161 of the IEV (IEC 50) and in CISPR Publications. The definitions stated in the EEC Directive take precedence.

For the purposes of this standard the following definitions apply.

**3.1 port** : Particular interface of the specified apparatus with the external electromagnetic environment (see Fig. 1).

**3.2 enclosure port** : The physical boundary of the apparatus through which electromagnetic fields may radiate or impinge.

**3.3 intrinsically safe circuit** : Circuit in which any spark or any thermal effect produced in the conditions as specified in EN 50020, which include normal operation and specified fault conditions, is not capable of causing ignition of a given explosive gas atmosphere.

**3.4 intrinsically safe port** : A port connected to an intrinsically safe circuit.

**3.5 power port** : A point on the enclosure at which a conductor or a cable is connected to the apparatus to deliver a.c. or d.c. power.

**3.6 I/O port** : A point on the enclosure at which a conductor or a cable is connected to the apparatus for input, output or bi-directional measurement or control purposes.

NOTE: Different ports may be combined in one connector.

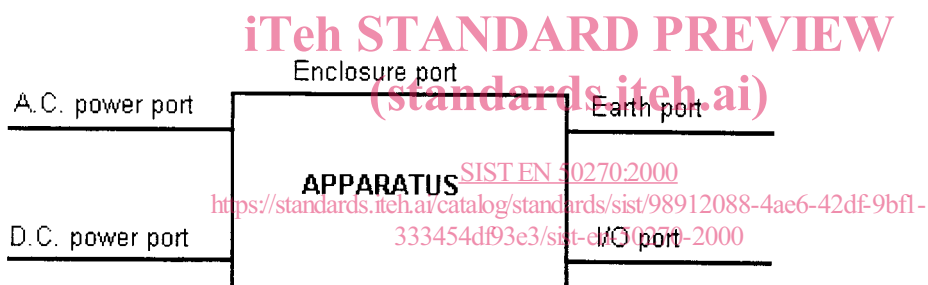
**3.7 earth port** : A port on the enclosure connected to an appropriate earth.

**3.8 sensor** : An assembly in which the sensing element is housed and which may contain associated circuit components.

**3.9 remote sensor** : A sensor which is not integral with the main body of the apparatus.

**3.10 potentially explosive atmosphere** : An atmosphere which could become explosive.

**3.11 safety barrier** : A device for obtaining intrinsic safety of electrical apparatus for potentially explosive atmospheres (see 8.1 of EN 50020).



**Figure 1 - Examples of ports**

## 4 Immunity tests

### 4.1 Test conditions

4.1.1 The description of the tests, the test generator, the test methods, and the test set-up are given in the basic standards which are referenced in Tables 1 to 5.

4.1.2 The tests shall be made in the most susceptible operating mode in the frequency bands being investigated consistent with normal applications. The configurations of the test sample shall be varied to achieve maximum susceptibility.

For portable battery powered apparatus which may also be operated when connected to an external power supply both operational modes (battery powered as well as externally supplied) shall be tested.

4.1.3 In cases where a manufacturers specification requires external protection devices or measures which are clearly specified in the users manual, the test requirements of this standard shall be applied with the external protection devices or measures in use.

4.1.4 The configuration and mode of operation during the tests shall be precisely noted in the test report. If the apparatus has different sensor types (e.g. electrochemical sensors or catalytic sensors) the apparatus shall be tested with each type of sensor. If the apparatus has more than one measuring range for a particular sensor the most sensitive specified by the manufacturer shall be tested. If the apparatus is



designed for the detection of a variety of gases where the target gas can be changed by changing the sensor of a given type only (e.g. electrochemical sensors) a representative sensor shall be tested.

4.1.5 The tests shall be applied to the relevant ports of the apparatus according to Tables 1 to 5. The tests shall only be carried out where the relevant ports exist.

If the apparatus has a large number of similar ports or ports with similar connections, then a sufficient number shall be selected to simulate actual operating conditions and to ensure that all the different types of termination are covered.

Connections between e.g. remote sensors or hand held terminals with the respective apparatus shall be considered as I/O lines respectively.

4.1.6 If a system consists of a central unit and additional separate equipment (e.g. remote sensors or printer) the control unit and the separate equipment may be tested separately if possible.

4.1.7 The tests shall be carried out under the normal operating conditions for temperature, humidity and pressure of the appropriate product standards and at the rated supply voltage, unless otherwise indicated in Tables 1 to 5.

4.1.8 The tests shall be performed with the apparatus showing a reading at the standard test gas concentrations or for alarm only apparatus, with an alarm condition, 10% relative above the alarm set point.

NOTE: This operating condition may be simulated (e.g. by inserting an absorbing filter into the optical path of an infrared sensor, but not by adjusting the sensitivity).

The test conditions shall be recorded in the test report.

For tests according to Table 6 for apparatus with measuring ranges lower than 21 % (v/v) oxygen the test shall be performed under test gas with concentrations around the middle of the measuring range.

4.1.9 The tests shall be carried out as single tests in sequence. The sequence of testing is optional.

4.1.10 Considering the electrical characteristics and the usage of a particular apparatus it may be concluded that some tests are inappropriate and therefore unnecessary. In such a case it is required that the decision and justification not to test shall be recorded in the test report.

The application of the immunity tests shall depend on the particular apparatus, its configuration, its ports, its technology and its typical operating conditions.

## 4.2 Performance criteria

The performance criteria, during or as a consequence of the EMC testing, as used in Tables 1 to 5 are the following:

Performance criterion A: The apparatus shall continue to operate as intended both during and after the test. When the apparatus is used as intended no loss of function is allowed and the performance shall not exceed the requirements given in Table 6 or the performance specified by the manufacturer in the instruction manual.

If the apparatus is claimed to conform to performance standards for gas detection instruments (e.g. prEN 45544, EN 50054, EN 50104, prEN 50194 or EN 50241) the performance requirements given in Table 6 shall not be exceeded.

Performance criterion B: The apparatus shall continue to operate as intended after the test. During the test, degradation of performance is allowed. No change of actual operating state or stored data or no continuous alarm is allowed. For alarm only apparatus no change of actual operating state or stored data or continuous deactivation of alarm is allowed.