
**Oprema za neprekinjeno spremljanje in nadzor radioaktivnosti v plinastih
izpuhah – 1. del: Splošne zahteve**

Equipment for continuous monitoring radioactivity in gaseous effluents – Part 1:
General requirements

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EUROPEAN STANDARD

EN 60761-1

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EUROPÄISCHE NORM

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English version

Equipment for continuous monitoring radioactivity in gaseous effluents
Part 1: General requirements
(IEC 60761-1:2002, modified)

Equipements de surveillance en continu
de la radioactivité
dans les effluents gazeux
Partie 1: Exigences générales
(CEI 60761-1:2002, modifiée)

Einrichtungen zur kontinuierlichen
Überwachung von Radioaktivität
in gasförmigen Ableitungen
Teil 1: Allgemeine Anforderungen
(IEC 60761-1:2002, modifiziert)

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This European Standard was approved by CENELEC on 2004-11-01. 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, 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

The text of the International Standard IEC 60761-1:2002, prepared by SC 45B, Radiation protection instrumentation, of IEC TC 45, Nuclear instrumentation, together with the common modifications prepared by the CENELEC BTTF 111-3 Instrumentation for ionizing radiation measurement and protection, was submitted to the formal vote and was approved by CENELEC as EN 60761-1 on 2004-11-01.

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 endorsement (dop) 2005-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-11-01

Subclauses, notes and annexes that are additional to those in the IEC standard are prefixed with the letter Z.

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 60761-1:2002 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

2 Normative references

Delete 'IEC 60068 (all parts)'.

Replace 'IEC 61000 (all parts)' by the standards referenced to in 28.6:

IEC 61000-4-2, *Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test*

IEC 61000-4-12, *Electromagnetic compatibility (EMC) - Part 4-12: Testing and measurement techniques - Oscillatory waves immunity test*

9 Measurement and indication characteristics

[SIST EN 60761-1:2005](https://standards.iteh.ai/catalog/standards/sist/en-60761-1-2005)

9.2 Measurement characteristics

Add the following note:

NOTE Requirements on detection limits and effective ranges of measurement may be found by referring to legal requirements or other national provisions.

11 Flow-rate characteristics of a fractional sample of effluent stream

11.3 Flow-rate measurement

Replace the last sentence by:

Corrections shall be made for the actual conditions of the effluent where appropriate.

11.4 Pressure control

Replace as follows:

11.4 Pressure control

If the measurement technique is sensitive to the pressure inside the measuring cell, a pressure measuring device shall be provided, with pressure alarm to warn of any excessive variation of the pressure in the measuring cell.

12 Alarms

12.1 Types of alarm

Replace the second paragraph by:

High level alarms and fault alarms shall give a separate local visual indication on the monitor. Facilities should be available for external alarms. Audible alarms may be provided in addition.

20 Electromagnetic interference

In the second paragraph **replace** “(IEC 61000)” by “(standards of IEC 61000 series)” as indicated in 28.6.

22 General test procedures

Add the following as the last paragraph:

Each test result shall be given with its uncertainty. This should be calculated using the ISO Guide to the Expression of Uncertainty in Measurement (GUM).

27 Electrical and mechanical characteristics

27.2 Warm-up time – Detection and measurement assembly

27.2.1 Requirements

Delete "(see Table 3)".

Add the following note:

NOTE When the level of activity being measured is extremely low, less than 10 times the decision threshold, the equipment may not give the indication required within the warm-up time. This is due to the statistical variations in the very low count rates being measured.

Add the following subclause after 27.8:

27.Z1 Voltage interruption

Any voltage interruption shall be indicated and automatic restart should occur after voltage interruption. In the case of automatic restart the duration of the interruption should be recorded.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE Where an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
-	-	Limits and methods of measurement of radio disturbance characteristics of information technology equipment	EN 55022	1994 ¹⁾
IEC 60038 (mod)	1983	Nominal voltages for low-voltage public electricity supply systems	HD 472 S1 + corr. February	1989 2002
IEC 60050-151	1978 ²⁾	International Electrotechnical Vocabulary (IEV) Part 151: Electrical and magnetic devices	-	-
IEC 60050-393	1996 ³⁾	Chapter 393: Nuclear instrumentation: Physical phenomena and basic concepts	-	-
IEC 60050-394	1995	Chapter 394: Nuclear instrumentation: Instruments	-	-
IEC 60068-2-27	1987	Basic environmental testing procedures Part 2: Tests - Test Ea and guidance: Shock	EN 60068-2-27	1993
IEC 60181	1964	Index of electrical measuring apparatus used in connection with ionizing radiation	-	-
IEC 60181A	1965	Index of electrical measuring apparatus used in connection with ionizing radiation	-	-
IEC 60761	Series	Equipment for continuous monitoring radioactivity in gaseous effluents	EN 60761	Series
IEC 61000-4-2	1995	Electromagnetic compatibility (EMC) Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	1995

¹⁾ EN 55022:1994 is superseded by EN 55022:1998.

²⁾ IEC 60050-151:1978 is superseded by IEC 60050-151:2001.

³⁾ IEC 60050-393:1996 is superseded by IEC 60050-393:2003.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-3	2002	Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2002
IEC 61000-4-4	1995	Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	1995
IEC 61000-4-5	1995	Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	1995
IEC 61000-4-12	1995	Part 4-12: Testing and measurement techniques - Oscillatory waves immunity test	EN 61000-4-12	1995
ISO	1995	Guide to the expression of uncertainty in measurement	-	-
ISO 2889	1975	General principles for sampling airborne radioactive materials	-	-
ISO 10012-1	1992	Quality assurance requirements for measuring equipment Part 1: Metrological confirmation system for measuring equipment	EN 30012-1	1993 ⁴⁾

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⁴⁾ EN 30012-1:1993 is superseded by EN ISO 10012:2003, which is based on ISO 10012:2003.

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INTERNATIONALE
INTERNATIONAL
STANDARD

CEI
IEC

60761-1

Deuxième édition
Second edition
2002-01

**Equipements de surveillance en continu
de la radioactivité dans les effluents gazeux –**

**Partie 1:
Exigences générales**

iTeh STANDARD PREVIEW

**Equipment for continuous monitoring
of radioactivity in gaseous effluents –**

SIST EN 60761-1:2005

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**Part 1:
General requirements**

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International Electrotechnical Commission
Telefax: +41 22 919 0300

e-mail: inmail@iec.ch

3, rue de Varembé Geneva, Switzerland
IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EQUIPMENT FOR CONTINUOUS MONITORING OF RADIOACTIVITY IN GASEOUS EFFLUENTS –

Part 1: General requirements

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a world-wide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International standard IEC 60761-1 has been prepared by subcommittee 45B: Radiation protection instrumentation, of IEC technical committee 45: Nuclear instrumentation.

This second edition cancels and replaces the first edition published in 1983. This second edition constitutes a technical revision.

The text of this standard is based on the first edition, and the following documents:

FDIS	Report on voting
45B/333/FDIS	45B/344/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

IEC 60761 consists of the following parts, under the general title: *Equipment for continuous monitoring of radioactivity in gaseous effluents*.

Part 1: General requirements

Part 2: Specific requirements for radioactive aerosol monitors including transuranic aerosols

Part 3: Specific requirements for radioactive noble gas monitors

Part 4: Specific requirements for radioactive iodine monitors

Part 5: Specific requirements for tritium monitors

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EQUIPMENT FOR CONTINUOUS MONITORING OF RADIOACTIVITY IN GASEOUS EFFLUENTS –

Part 1: General requirements

1 Scope and object

This part of IEC 60761 defines acceptable forms of such monitoring, provides some general guidance as to the possible range of measurement and capability of such equipment as may be envisaged, and indicates when and where its uses may be practicable.

This standard is applicable to equipment for continuous monitoring of radioactivity in gaseous effluents during normal operations and during anticipated operational occurrences. This standard does not apply to equipment specifically for use in accident conditions. Such equipment may require additional capabilities.

This standard is restricted to equipment for continuously monitoring radioactivity in gaseous effluent. It does not deal with sample extraction and laboratory analysis.

The object of this standard is to lay down mandatory general requirements and give examples of acceptable methods for equipment for continuous monitoring of radioactivity in gaseous effluents.

It specifies, for the equipment described above, the general characteristics, general test procedures, radiation, electrical, safety and environmental characteristics and the identification and certification of the equipment. If this equipment is part of a centralized system for continuous radiation monitoring in a nuclear facility, there may be additional requirements from other standards related to those systems.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60761. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60761 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60038:1983, *IEC standard voltages*

IEC 60050(151):1978, *International Electrotechnical Vocabulary (IEV) – Chapter 151: Electrical and magnetic devices*

IEC 60050(393):1996, *International Electrotechnical Vocabulary (IEV) – Chapter 393: Nuclear instrumentation – Physical phenomena and basic concepts*

IEC 60050(394):1995, *International Electrotechnical Vocabulary (IEV) – Chapter 394: Nuclear instrumentation – Instruments*