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Standards

Irish Standard  
I.S. EN IEC 62327:2019

Radiation protection instrumentation -  
Hand-held instruments for the detection  
and identification of radionuclides and for  
the estimation of ambient dose equivalent  
rate from photon radiation

**I.S. EN IEC 62327:2019**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

I.S. EN IEC 62327:2019 is the adopted Irish version of the European Document EN IEC 62327:2019, Radiation protection instrumentation - Hand-held instruments for the detection and identification of radionuclides and for the estimation of ambient dose equivalent rate from photon radiation

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EUROPEAN STANDARD

**EN IEC 62327**

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2019

ICS 13.280

Supersedes EN 62327:2011 and all of its amendments  
and corrigenda (if any)

English Version

**Radiation protection instrumentation - Hand-held instruments for  
the detection and identification of radionuclides and for the  
estimation of ambient dose equivalent rate from photon radiation  
(IEC 62327:2017)**

Instrumentation pour la radioprotection  $\zeta$  Instruments  
portables pour la détection et l'identification des  
radionucléides et pour l'estimation du débit d'équivalent de  
dose ambiant pour le rayonnement de photons  
(IEC 62327:2017)

To be completed  
(IEC 62327:2017)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## **EN IEC 62327:2019 (E)**

### **European foreword**

The text of document 45B/882/FDIS, future edition 2 of IEC 62327, prepared by SC 45B "Radiation protection instrumentation" of IEC/TC 45 "Nuclear instrumentation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62327:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-07-07
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-10-07

This document supersedes EN 62327:2011.

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The text of the International Standard IEC 62327:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60086-1:2015            NOTE    Harmonized as EN 60086-1:2015 (not modified)

IEC 60721-3-7            NOTE    Harmonized as EN 60721-3-7

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-395	2014	International Electrotechnical Vocabulary -- Part 395: Nuclear instrumentation: Physical phenomena, basic concepts, instruments, systems, equipment and detectors		-
IEC 60068-2-1	-	Environmental testing - Part 2-1: Tests Test A: Cold	-EN 60068-2-1	-
IEC 60068-2-2	-	Environmental testing - Part 2-2: Tests Test B: Dry heat	-EN 60068-2-2	-
IEC 60068-2-11	-	Basic environmental testing procedures Part 2-11: Tests - Test Ka: Salt mist	-EN 60068-2-11	-
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests Test N: Change of temperature	-EN 60068-2-14	-
IEC 60068-2-18	-		EN 60068-2-18	-
IEC 60068-2-27	2008	Environmental testing - Part 2-27: Tests Test Ea and guidance: Shock	-EN 60068-2-27	2009
IEC 60068-2-64	-	Environmental testing - Part 2-64: Tests Test Fh: Vibration, broadband random and guidance	-EN 60068-2-64	-
IEC 60068-2-66	-	Environmental testing - Part 2: Test methods - Test Cx: Damp heat, steady state (unsaturated pressurized vapour)	EN 60068-2-66	-
IEC 60068-2-68	-	Environmental testing - Part 2-68: Tests Test L: Dust and sand	-EN 60068-2-68	-
IEC 60529	-	Degrees of protection provided by-enclosures (IP Code)		-
IEC 60846-1 (mod)	-	Radiation protection instrumentation Ambient and/or directional dose equivalent (rate) meters and/or monitors for beta, X and gamma radiation - Part 1: Portable workplace and environmental meters and monitors	-EN 60846-1	-
IEC 60846-2 (mod)	-	Radiation protection instrumentation Ambient and/or directional dose equivalent (rate) meters and/or monitors for beta, X and gamma radiation - Part 2: High range beta and photon dose and dose rate portable instruments for emergency radiation protection purposes	-EN 60846-2	-

**I.S. EN IEC 62327:2019****EN IEC 62327:2019 (E)**

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
IEC 61000-4-3	2006	Electromagnetic compatibility (EMC) - Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2006
IEC 61000-4-6	2013	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	2014
IEC 61000-4-8	2009	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	2010
IEC 61005 (mod)	-		EN 61005	-
IEC 61187 (mod)	-	Electrical and electronic measuring equipment - Documentation	EN 61187	-
			+EN 61187:1994/corrigendum Mar. 1995	1995
IEC 62706	-	Radiation protection instrumentation -- Environmental, electromagnetic and mechanical performance requirements		-
IEC 62755	-	Radiation protection instrumentation - Data-format for radiation instruments used in the detection of illicit trafficking of radioactive materials		-





**IEC 62327**

Edition 2.0 2017-12

# **INTERNATIONAL STANDARD**

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**Radiation protection instrumentation – Hand-held instruments for the detection and identification of radionuclides and for the estimation of ambient dose equivalent rate from photon radiation**





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**IEC 62327**

Edition 2.0 2017-12

# **INTERNATIONAL STANDARD**

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**Radiation protection instrumentation – Hand-held instruments for the detection and identification of radionuclides and for the estimation of ambient dose equivalent rate from photon radiation**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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### **RADIATION PROTECTION INSTRUMENTATION – HAND-HELD INSTRUMENTS FOR THE DETECTION AND IDENTIFICATION OF RADIONUCLIDES AND FOR THE ESTIMATION OF AMBIENT DOSE EQUIVALENT RATE FROM PHOTON RADIATION**

#### FOREWORD

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International Standard IEC 62327 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 of IEC 62327, issued in 2006. It constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) addition of detailed methods of test;
- b) revised identification test acceptance criteria for environmental tests;
- c) changed format to match SC 45B template.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
45B/882/FDIS	45B/887/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

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



## INTRODUCTION

Illicit and inadvertent movement of radioactive materials in the form of radiation sources and contaminated metallurgical scrap has become a problem of increasing importance. Radioactive sources out of regulatory control, so-called “orphan sources”, have frequently caused serious radiation exposures and widespread contamination. Although illicit trafficking in nuclear and other radioactive materials is not a new phenomenon, concern about a nuclear “black market” has increased in the last few years particularly in view of its terrorist potential.

In response to the technical policy of the International Atomic Energy Agency (IAEA), the World Customs Organization (WCO) and the International Criminal Police Organization (Interpol) related to the detection and identification of special nuclear materials and security trends, nuclear instrumentation companies are developing and manufacturing radiation instrumentation to assist in the detection of illicit movement of radioactive and special nuclear materials. This type of instrumentation is widely used for security purposes at nuclear facilities, border control checkpoints, and international seaports and airports. However, to ensure that measurement results made at different locations are consistent, it is imperative that radiation instrumentation be designed to rigorous specifications based upon agreed performance requirements stated in this document. IEC standards have also been developed to address personal radiation detectors, radiation portal monitors, highly sensitive gamma and neutron detection systems, spectrometric personal radiation detectors, and backpack-based radiation detection and identification systems. Table 1 below contains a list of those standards.

**Table 1 – IEC standards concerning instruments for the detection of illicit trafficking of radioactive material**

Type of instrumentation	IEC number	Title of the standard
Body-worn	62401	Radiation protection instrumentation – Alarming Personal Radiation Devices (PRDs) for the detection of illicit trafficking of radioactive material
	62618	Radiation protection instrumentation – Spectroscopy-Based Alarming Personal Radiation Devices (SPRD) for detection of illicit trafficking of radioactive material
	62694	Radiation protection instrumentation – Backpack-type radiation detector (BRD) for detection of illicit trafficking of radioactive material
Portable or hand-held	62327	Radiation protection instrumentation – Hand-held instruments for the detection and identification of radionuclides and for the estimation of ambient dose equivalent rate from photon radiation
	62533	Radiation protection instrumentation – Highly sensitive hand-held instruments for photon detection of radioactive material
	62534	Radiation protection instrumentation – Highly sensitive hand-held instruments for neutron detection of radioactive material
Portal	62244	Radiation protection instrumentation – Installed radiation portal monitors (RPMs) for the detection of illicit trafficking of radioactive and nuclear materials
	62484	Radiation protection instrumentation – Spectroscopy-based portal monitors used for the detection and identification of illicit trafficking of radioactive material
Data format	62755	Radiation protection instrumentation – Data format for radiation instruments used in the detection of illicit trafficking of radioactive materials

# RADIATION PROTECTION INSTRUMENTATION – HAND-HELD INSTRUMENTS FOR THE DETECTION AND IDENTIFICATION OF RADIONUCLIDES AND FOR THE ESTIMATION OF AMBIENT DOSE EQUIVALENT RATE FROM PHOTON RADIATION

## 1 Scope

This document applies to hand-held instruments used to detect and identify radionuclides and radioactive material, to estimate ambient dose equivalent rate from photon radiation, and optionally, to detect neutron radiation. They are commonly known as radionuclide identification devices or RIDs.

This document specifies general characteristics, general test procedures, radiation characteristics, as well as electrical, mechanical, safety, and environmental characteristics.

This document does not cover laboratory type, high-resolution photon spectrometers, or instruments covered by IEC 60846-1 (Portable workplace and environmental meters and monitors), IEC 60846-2 (photon dose (rate) meters) or IEC 61005 (neutron dose equivalent (rate) meters).

Table 8 provides a summary of requirements and relevant clauses.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60050-395:2014, *International Electrotechnical Vocabulary (IEV) – Part 395: Nuclear instrumentation: physical phenomena, basic concepts, instruments, systems, equipment and detectors*

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-11, *Basic environmental testing procedures – Part 2 -11: Tests – Test Ka: Salt mist*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-18, *Environmental testing – Part 2-18: Tests – Test R and guidance: Water*

IEC 60068-2-27:2008, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-64, *Environmental testing – Part 2-64: Tests – Test Fh: Vibration, broadband random and guidance*

IEC 60068-2-66, *Environmental testing – Part 2-66: Test methods – Test Cx: Damp heat, steady state (unsaturated pressurized vapour)*

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