



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 18589-7:2016

# Measurement of radioactivity in the environment - Soil - Part 7: In situ measurement of gamma-emitting radionuclides (ISO 18589-7:2013)

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**I.S. EN ISO 18589-7:2016**

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## National Foreword

I.S. EN ISO 18589-7:2016 is the adopted Irish version of the European Document EN ISO 18589-7:2016, Measurement of radioactivity in the environment - Soil - Part 7: In situ measurement of gamma-emitting radionuclides (ISO 18589-7:2013)

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EUROPEAN STANDARD

EN ISO 18589-7

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2016

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English Version

**Measurement of radioactivity in the environment - Soil -  
Part 7: In situ measurement of gamma-emitting  
radionuclides (ISO 18589-7:2013)**

Mesurage de la radioactivité dans l'environnement -  
Sol - Partie 7: Mesurage in situ des radionucléides  
émetteurs gamma (ISO 18589-7:2013)

Ermittlung der Radioaktivität in der Umwelt -  
Erdboden - Teil 7: In-situ-Messung von  
Gammastrahlung emittierenden Radionukliden (ISO  
18589-7:2013)

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

**EN ISO 18589-7:2016 (E)**

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## **European foreword**

The text of ISO 18589-7:2013 has been prepared by Technical Committee ISO/TC 85 “Nuclear energy, nuclear technologies, and radiological protection” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 18589-7:2016 by Technical Committee CEN/TC 430 “Nuclear energy, nuclear technologies, and radiological protection” the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.

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## **Endorsement notice**

The text of ISO 18589-7:2013 has been approved by CEN as EN ISO 18589-7:2016 without any modification.

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# INTERNATIONAL STANDARD

**ISO  
18589-7**

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## **Measurement of radioactivity in the environment — Soil —**

### **Part 7: In situ measurement of gamma- emitting radionuclides**

*Mesurage de la radioactivité dans l'environnement — Sol —*

*Partie 7: Mesurage in situ des radionucléides émetteurs gamma*



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**ISO 18589-7:2013(E)**



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## ISO 18589-7:2013(E)

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. [www.iso.org/directives](http://www.iso.org/directives)

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. [www.iso.org/patents](http://www.iso.org/patents)

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The committee responsible for this document is ISO/TC 85, *Nuclear energy, nuclear technologies, and radiological protection*, Subcommittee SC 2, *Radiological protection*.

ISO 18589 consists of the following parts, under the general title *Measurement of the radioactivity in the environment — Soil*:

- *Part 1: General guidelines and definitions*
- *Part 2: Guidance for the selection of the sampling strategy, sampling and pre-treatment of samples*
- *Part 3: Measurements of gamma-emitting radionuclides*
- *Part 4: Measurement of plutonium isotopes (plutonium 238 and plutonium 239 + 240) by alpha spectrometry*
- *Part 5: Measurement of strontium 90*
- *Part 6: Measurement of gross alpha and gross beta activities*
- *Part 7: In situ measurement of gamma-emitting radionuclides*

## **Introduction**

*In situ* gamma spectrometry is a rapid and accurate technique to assess the activity concentration of gamma-emitting radionuclides present in the top soil layer or deposited onto the soil surface. This method is also used to assess the dose rates of individual radionuclides.

*In situ* gamma spectrometry is a direct physical measurement of radioactivity that does not need any soil samples, thus reducing the time and cost of laboratory analysis of large number of soil samples.

The quantitative analysis of the recorded line spectra requires a suitable area for the measurement. Furthermore, it is required to know the physicochemical properties of the soil and the vertical distribution in the soil to assess the activity of the radionuclides.



# Measurement of radioactivity in the environment — Soil —

## Part 7:

### In situ measurement of gamma-emitting radionuclides

#### 1 Scope

This part of 18589 specifies the identification of radionuclides and the measurement of their activity in soil using *in situ* gamma spectrometry with portable systems equipped with germanium or scintillation detectors.

This part of ISO 18589 is suitable to rapidly assess the activity of artificial and natural radionuclides deposited on or present in soil layers of large areas of a site under investigation.

This part of ISO 18589 can be used in connection with radionuclide measurements of soil samples in the laboratory (ISO 18589-3) in the following cases:

- routine surveillance of the impact of radioactivity released from nuclear installations or of the evolution of radioactivity in the region;
- investigations of accident and incident situations;
- planning and surveillance of remedial action;
- decommissioning of installations or the clearance of materials.

It can also be used for the identification of airborne artificial radionuclides, when assessing the exposure levels inside buildings or during waste disposal operations.

Following a nuclear accident, *in situ* gamma spectrometry is a powerful method for rapid evaluation of the gamma activity deposited onto the soil surface as well as the surficial contamination of flat objects.

**NOTE** The method described in this part of ISO 18589 is not suitable when the spatial distribution of the radionuclides in the environment is not precisely known (influence quantities, unknown distribution in soil) or in situations with very high photon flux. However, the use of small volume detectors with suitable electronics allows measurements to be performed under high photon flux.

#### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

IEC 61275, *Radiation protection instrumentation — Measurement of discrete radionuclides in the environment — In situ photon spectrometry system using a germanium detector*

ISO 11929, *Determination of the characteristic limits (decision threshold, detection limit and limits of the confidence interval) for measurements of ionizing radiation — Fundamentals and application*

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