

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

## EESTI STANDARDI EESSÕNA

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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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## 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of an identical text or by endorsement, at the latest by October 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.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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## 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*