

Nuclear energy — Waste-packages activity measurement —

**Part 1: High-resolution gamma
spectrometry in integral mode with
open geometry**

ICS 13.030.30; 17.240

National foreword

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The UK participation in its preparation was entrusted to Technical Committee NCE/9, Nuclear fuel cycle technology, which has the responsibility to:

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- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii to v, a blank page, pages 1 to 20, an inside back cover and a back cover.

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Nuclear energy — Waste-packages activity measurement —

Part 1: High-resolution gamma spectrometry in integral mode with open geometry

Énergie nucléaire — Mesurage de l'activité de colis de déchets —

*Partie 1: Spectrométrie gamma haute résolution en mode intégral et
géométrie ouverte*



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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.

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 14850-1 was prepared by Technical Committee ISO/TC 85, *Nuclear energy*, Subcommittee SC 5, *Nuclear fuel technology*.

ISO 14850 consists of the following parts, under the general title *Nuclear energy — Waste-packages activity measurement*:

- *Part 1: High-resolution gamma spectrometry in integral mode with open geometry*
- *Part 2: Gamma-ray spectrometry using HPGe detectors*

Introduction

Several non destructive methods may be used after calibration to determine the radioactive characteristics of a waste package:

- gamma spectrometry;
- passive neutron counting, with or without discrimination of neutrons originating from (α ,n) reactions;
- active neutron counting, with detection of neutrons resulting from induced fission reactions (prompt or delayed neutrons).

This part of ISO 14850 describes one procedure for measuring the activity contained in waste packages by gamma spectrometry and points out recommendations for the calibration of a measurement chain.

Nuclear energy — Waste-packages activity measurement —

Part 1: High-resolution gamma spectrometry in integral mode with open geometry

1 Scope

This part of ISO 14850 describes a procedure for measurements of gamma-emitting radionuclide activity in the following homogeneous objects:

- unconditioned waste, including process waste (filters, control rods, etc.), dismantling waste, etc.;
- waste conditioned in various matrices (bitumen, hydraulic binder, thermosetting resins, etc.), notably in the form of 100 l, 200 l, 400 l or 800 l drums, and test specimens or samples, (vitrified waste);
- waste packaged in a container, notably technological waste.

It also specifies the calibration of the gamma spectrometry chain.

The gamma energies used generally range from 0,05 MeV to 3 MeV.

2 Terms, definitions and symbols

For the purposes of this document, the following terms and definitions apply.

2.1

reference source

radionuclide sealed in a suitable containment, of which the radioactive characteristics are determined by comparison with a reference material

2.2

source volume

volume in m³ taken up by the matrix (or by the waste) in which the activity is distributed

2.3

source weight

weight in kg of the matrix in which the activity is distributed

2.4

package

object to be characterized, comprising an outer shell (container or canister) surrounding the (conditioned or unconditioned) source volume

2.5

mockup

package consisting of a container and of well-known materials representative of a matrix