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STANDARD

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**7503-3**

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**Evaluation of surface contamination —**

**Part 3:**

Isomeric transition and electron capture  
emitters, low energy beta-emitters  
( $E_{\beta\max} < 0,15 \text{ MeV}$ )

*Évaluation de la contamination de surface —*

*Partie 3: Émetteurs à transition isomérique et capture électronique,  
émetteurs bêta basse énergie ( $E_{\beta\max} < 0,15 \text{ MeV}$ )*



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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.

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.

International Standard ISO 7503-3 was prepared by Technical Committee ISO/TC 85, *Nuclear energy*, Subcommittee SC 2, *Radiation protection*.

ISO 7503 consists of the following parts, under the general title *Evaluation of surface contamination*:

- Part 1: *Beta-emitters (maximum beta energy greater than 0,15 MeV) and alpha-emitters*
- Part 2: *Tritium surface contamination*
- Part 3: *Isomeric transition and electron capture emitters, low energy beta-emitters ( $E_{\beta\text{max}} < 0,15 \text{ MeV}$ )*

Annexes A to D form an integral part of this part of ISO 7503. Annexes E and F are for information only.

## Introduction

This part of ISO 7503 provides recommendations for surface contamination measurements for two groups of radionuclides.

- a) Radionuclides which can only be detected and measured with the aid of the following emissions:
- gamma radiation and X-rays from isomeric transitions and electron capture processes,
  - electrons from internal conversion processes and Auger-electrons,
  - Low-energy beta radiation ( $E_{\beta_{\max}} < 0.15$  MeV) from classical beta decay.
- b) Beta-emitters which do not emit one electron per decay.

Widespread application and involvement of such radionuclides in nuclear medicine, industrial processes and research, under conditions which do not allow full control of the radionuclide spread, have led to the necessity to view critically surface contamination problems in connection with unconfined use. Health and sanitation problems may occur due to the fact that the possible existence and/or extent of surface contamination remains undetected because measurements are made with an instrument not suited to the purpose. Such problems may arise due to the low energy and complexity of the characteristic emissions of the nuclides.

The wide range of particle types and energies makes it necessary to select an instrument appropriate to the radionuclide, if satisfactory health and safety information is to be obtained. It is the purpose of this document to provide the necessary information for the selection of measurement and calibration methods.

## Evaluation of surface contamination —

### Part 3:

Isomeric transition and electron capture emitters, low energy beta-emitters ( $E_{\beta\text{max}} \leq 0,15$  MeV)

#### 1 Scope

This part of ISO 7503 applies to the evaluation of contamination on surfaces of facilities and equipment, containers of radioactive materials and sealed sources in terms of activity per unit area. It does not apply to the evaluation of contamination of skin or clothing.

It is restricted to the direct measurement by portable probes and to the indirect measurement of the radionuclides mentioned in the Introduction and listed in table A.1 of annex A.

For each radionuclide, the energy spectrum as well as the intensity of each type of emitted particle or photon is unique. This type of information can be found in the bibliographic references given in annex F.

For the purpose of this part of ISO 7503, the term "beta energy" refers to the maximum energy of particles from classical beta decay.

NOTE — Evaluation of surface contamination by beta-emitters (beta energy greater than 0,15 MeV) and alpha-emitters is dealt with in ISO 7503-1. Evaluation of tritium surface contamination is dealt with in ISO 7503-2.

#### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 7503. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7503 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7503-1:1988, *Evaluation of surface contamination — Part 1: Beta-emitters (maximum beta energy greater than 0,15 MeV) and alpha-emitters.*

ISO 8769-2:—<sup>1)</sup>, *Reference sources for the calibration of surface contamination monitors — Part 2: Electrons of energy less than 0,15 MeV and photons.*

IEC 248:1984, *Dimensions of planchets used in nuclear electronic instruments.*

IEC 325:1981, *Alpha, beta and alpha-beta contamination meters and monitors.*

1) To be published.