

INTERNATIONAL STANDARD

ISO
4037-1

First edition
1996-12-15

X and gamma reference radiation for calibrating dosimeters and dose rate meters and for determining their response as a function of photon energy —

Part 1:

Radiation characteristics and production
methods

*Rayonnements X et gamma de référence pour l'étalonnage des
dosimètres et des débitmètres, et pour la détermination de leur réponse
en fonction de l'énergie des photons —*

Partie 1: Caractéristiques des rayonnements et méthodes de production



Reference number
ISO 4037-1:1996(E)

Contents

Page

| | | |
|---|-----------------------------------------------------------|----|
| 1 | Scope..... | 1 |
| 2 | Normative references..... | 1 |
| 3 | Definitions..... | 3 |
| 4 | Continuous reference filtered X radiation..... | 4 |
| 5 | Fluorescence X radiation..... | 12 |
| 6 | Gamma radiation emitted by radionuclides..... | 16 |
| 7 | Photon radiation with energy between 4 MeV and 9 MeV..... | 19 |

Annex

| | | |
|---|-------------------|----|
| A | Bibliography..... | 41 |
|---|-------------------|----|

© ISO 1996

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

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 4037-1 was prepared by Technical Committee ISO/TC 85, *Nuclear energy*, Subcommittee SC 2, *Radiation protection*.

This first edition of ISO 4037-1, along with ISO-4037-2, cancels and replaces the first edition of ISO 4037:1979, which has been technically revised.

ISO 4037 consists of the following parts, under the general title *X and gamma reference radiation for calibrating dosimeters and dose rate meters and for determining their response as a function of photon energy*.

- *Part 1: Radiation characteristics and production methods*
- *Part 2: Dosimetry of X and gamma reference radiation for radiation protection over the energy ranges 8 keV to 1,3 MeV and 4 MeV to 9 MeV*

Annex A of this part of ISO 4037 is for information only.

This document is a preview generated by EVS

This page intentionally left blank

X and gamma reference radiation for calibrating dosimeters and dose rate meters and for determining their response as a function of photon energy —

Part 1:

Radiation characteristics and production methods

1 Scope

This part of ISO 4037 specifies the characteristics and production methods of X and gamma reference radiation for calibrating protection-level dosimeters and rate dosimeters at air kerma rates from $10 \mu\text{Gy}\cdot\text{h}^{-1}$ to $10 \text{Gy}\cdot\text{h}^{-1}$ and for determining their response as a function of photon energy. The methods for producing a group of reference radiations for a particular photon-energy range are described in four sections which define the characteristics of these radiations. The four groups of reference radiation are:

- in the energy range from about 7 keV to 250 keV, continuous filtered X radiation and the gamma radiation of americium-241;
- in the energy range 8 keV to 100 keV, fluorescence X radiation;
- in the energy range 600 keV to 1,3 MeV, gamma radiation emitted by radionuclides;
- in the energy range 4 MeV to 9 MeV, gamma radiation produced by reactors and accelerators.

These reference radiations should be selected from table 1.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 4037. At the time of the publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 4037 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 197-1:1983, *Copper and copper alloys — Terms and definitions — Part 1: Materials*.

ISO 1677:1977, *Sealed radioactive sources — General*.

ISO 3534-1:1993, *Statistics — Vocabulary and symbols — Part 1: Probability and general statistical terms*.

ISO 8963:1988, *Dosimetry of X and gamma reference radiations for radiation protection over the energy range from 8 keV to 1,3 MeV*.

ICRU Report 10b, *Physical Aspects of Irradiation*, National Bureau of Standards Handbook **85**(1964).