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

**Part 2:**

Dosimetry for radiation protection over the  
energy ranges 8 keV to 1,3 MeV and 4 MeV to  
9 MeV

*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 2: Dosimétrie pour la radioprotection dans les gammes d'énergie de  
8 keV à 1,3 MeV et de 4 MeV à 9 MeV*



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

This first edition of ISO 4037-2, along with ISO 4037-1, 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*
- *Part 3: Calibration of area and personal dosimeters*

Annexes A and B of this part of ISO 4037 are for information only.

## Introduction

The term "dosimetry" is used in this part of ISO 4037 to describe the method by which the value of a physical quantity characterizing the interaction of radiation with matter may be measured at a given point by the use of a calibrated standard instrument. Dosimetry is the basis for the calibration of radiation protection instruments and devices and the determination of their response as a function of the energy of the radiation of interest.

At present, the quantities in which photon secondary-standard instruments or sources are calibrated for use in radiological protection calibration laboratories relate to measurements made in free air, i.e. air kerma.

NOTE Throughout this part of ISO 4037, kerma is used as an abbreviation for air kerma.

In order to correlate measured physical quantities with the magnitude of a biological effect, a quantity of the dose equivalent type [1] is required for use in radiation protection. ICRU has defined such quantities [2] and a further International Standard will be issued containing tables of conversion coefficients from air kerma to these dose equivalent quantities (see ISO 4037-3).

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

## Part 2:

Dosimetry for radiation protection over the energy ranges 8 keV to 1,3 MeV and 4 MeV to 9 MeV

### 1 Scope

This part of ISO 4037 specifies the procedures for the dosimetry of X and gamma reference radiation for the calibration of radiation protection instruments over the energy range from approximately 8 keV to 1,3 MeV and from 4 MeV to 9 MeV. The methods of production and nominal kerma rates obtained from these reference radiations are given in ISO 4037-1.

### 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 the 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 4037-1:— <sup>1)</sup> ,	<i>X and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy - Part 1: Radiation characteristics and production methods.</i>
ISO 4037-3:— <sup>2)</sup> ,	<i>X and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy — Part 3: Calibration of area and personal dosimeters.</i>
ICRU Report 33:1980,	<i>Radiation quantities and units.</i>
VIM, 1984,	<i>International Vocabulary of Basic and General Terms in Metrology</i> , BIPM-IEC-ISO-OIML.

1) To be published. (Revision of ISO 4037:1979)

2) To be published.