

STN	Jadrová energia Referenčné beta žiarenie Časť 3: Kalibrácia dozimetrických prístrojov a osobných dozimetrov a stanovenie ich odpovede ako funkcie energie beta žiarenia a uhla dopadu (ISO 6980-3: 2023)	STN EN ISO 6980-3 40 1030
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Nuclear energy - Reference beta-particle radiation - Part 3: Calibration of area and personal doseimeters and the determination of their response as a function of beta radiation energy and angle of incidence (ISO 6980-3:2023)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 01/26

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EUROPEAN STANDARD

EN ISO 6980-3

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English Version

**Nuclear energy - Reference beta-particle radiation - Part 3:
Calibration of area and personal dosimeters and the
determination of their response as a function of beta
radiation energy and angle of incidence (ISO 6980-3:2023)**

Énergie nucléaire - Rayonnement bêta de référence -
Partie 3: Étalonnage des dosimètres individuels et des
dosimètres de zone et détermination de leur réponse
en fonction de l'énergie des particules bêta et de l'angle
d'incidence du rayonnement bêta (ISO 6980-3:2023)

This European Standard was approved by CEN on 22 September 2025.

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EN ISO 6980-3:2025 (E)

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European foreword

The text of ISO 6980-3:2023 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 6980-3:2025 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of an identical text or by endorsement, at the latest by March 2026, and conflicting national standards shall be withdrawn at the latest by March 2026.

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Endorsement notice

The text of ISO 6980-3:2023 has been approved by CEN as EN ISO 6980-3:2025 without any modification.

INTERNATIONAL STANDARD

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Nuclear energy — Reference beta- particle radiation —

Part 3: Calibration of area and personal dosimeters and the determination of their response as a function of beta radiation energy and angle of incidence

Énergie nucléaire — Rayonnement bêta de référence —

Partie 3: Étalonnage des dosimètres individuels et des dosimètres de zone et détermination de leur réponse en fonction de l'énergie des particules bêta et de l'angle d'incidence du rayonnement bêta



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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 85, *Nuclear energy, nuclear technologies, and radiological protection*, Subcommittee SC 2, *Radiological protection*.

This third edition of ISO 6980-3 cancels and replaces ISO 6980-3:2022, of which it constitutes a minor revision.

The main changes are the following:

- editorial changes throughout the document.

A list of all the parts in the ISO 6980 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

ISO 6980 series covers the production, calibration, and use of beta-particle reference radiation fields for the calibration of dosimeters and dose-rate meters for protection purposes. This document describes procedures for the calibration of dosimeters and dose-rate meters and the determination of their response as a function of beta-particle energy and angle of beta-particle incidence. ISO 6980-1 describes the methods of production and characterization of the reference radiation. ISO 6980-2 describes procedures for the determination of absorbed dose rate at a reference depth of tissue from beta particle reference radiation fields.

For beta particles, the calibration and the determination of the response of dosimeters and dose-rate meters is essentially a three-step process. First, the basic field quantity, absorbed dose to tissue at a depth of 0,07 mm (and optionally also at a depth of 3 mm) in a tissue-equivalent slab geometry is measured at the point of test, using methods described in ISO 6980-2. Then, the appropriate operational quantity is derived by the application of a conversion coefficient that relates the quantity measured (reference absorbed dose) to the selected operational quantity for the selected irradiation geometry. Finally, the reference point of the device under test is placed at the point of test for the calibration and determination of the response of the dosimeter. Depending on the type of dosimeter under test, the irradiation is either carried out on a phantom or free-in-air for personal and area dosimeters, respectively. For individual and area monitoring, this document describes the methods and the conversion coefficients to be used for the determination of the response of dosimeters and dose-rate meters in terms of the ICRU operational quantities, i.e., directional dose equivalent, $H'(0,07;\Omega)$ and $H'(3;\Omega)$, as well as personal dose equivalent, $H_p(0,07)$ and $H_p(3)$.

Nuclear energy — Reference beta-particle radiation —

Part 3:

Calibration of area and personal dosimeters and the determination of their response as a function of beta radiation energy and angle of incidence

1 Scope

This document describes procedures for calibrating and determining the response of dosimeters and dose-rate meters in terms of the operational quantities for radiation protection purposes defined by the International Commission on Radiation Units and Measurements (ICRU). However, as noted in ICRU 56^[2], the ambient dose equivalent, $H^*(10)$, used for area monitoring, and the personal dose equivalent, $H_p(10)$, as used for individual monitoring, of strongly penetrating radiation, are not appropriate quantities for any beta radiation, even that which penetrates 10 mm of tissue ($E_{\max} > 2$ MeV).

This document is a guide for those who calibrate protection-level dosimeters and dose-rate meters with beta-reference radiation and determine their response as a function of beta-particle energy and angle of incidence. Such measurements can represent part of a type test during the course of which the effect of other influence quantities on the response is examined. This document does not cover the in-situ calibration of fixed, installed area dosimeters. The term “dosimeter” is used as a generic term denoting any dose or dose-rate meter for individual or area monitoring. In addition to the description of calibration procedures, this document includes recommendations for appropriate phantoms and the way to determine appropriate conversion coefficients. Guidance is provided on the statement of measurement uncertainties and the preparation of calibration records and certificates.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6980-1, *Nuclear energy — Reference beta-particle radiations — Part 1: Methods of production*

ISO 6980-2, *Nuclear energy — Reference beta-particle radiation — Part 2: Calibration fundamentals related to basic quantities characterizing the radiation field*

ISO/IEC 17025:2017, *General requirements for the competence of testing and calibration laboratories*

ISO 29661, *Reference radiation fields for radiation protection — Definitions and fundamental concepts*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

ISO/IEC Guide 99, *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

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