

<b>STN</b>	<b>Neutrónové referenčné radičné polia Časť 3: Kalibrácia dozimetrov prostredia a osobných dozimetrov a stanovenie ich odozvy ako funkcie energie neutrónov a uhla dopadu (ISO 8529-3: 2023, vrátane opravenej verzie 2023-09)</b>	<b>STN EN ISO 8529-3</b>  40 1416
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Neutron reference radiation fields - Part 3: Calibration of area and personal dosimeters and determination of their response as a function of neutron energy and angle of incidence (ISO 8529-3:2023, including corrected version 2023-09)

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. 09/24

Obsahuje: EN ISO 8529-3:2024, ISO 8529-3:2023

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EUROPEAN STANDARD

EN ISO 8529-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2024

ICS 17.240

English Version

Neutron reference radiation fields - Part 3: Calibration of area and personal dosimeters and determination of their response as a function of neutron energy and angle of incidence (ISO 8529-3:2023, including corrected version 2023-09)

Champs de rayonnement neutronique de référence -  
Partie 3: Étalonnage des dosimètres de zone et  
individuels et détermination de leur réponse en  
fonction de l'énergie et de l'angle d'incidence des  
neutrons (ISO 8529-3:2023, y compris version corrigée  
2023-09)

Neutronen-Referenzstrahlungsfelder - Teil 3:  
Kalibrierung von Orts- und Personendosimetern und  
Bestimmung ihres Ansprechvermögens als Funktion  
der Neutronenenergie und des Einfallswinkels (ISO  
8529-3:2023, einschließlich der korrigierten Fassung  
von 2023-09)

This European Standard was approved by CEN on 7 July 2024.

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**EN ISO 8529-3:2024 (E)**

<b>Contents</b>	<b>Page</b>
<b>European foreword.....</b>	<b>3</b>

## **European foreword**

The text of ISO 8529-3:2023, including corrected version 2023-09 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 8529-3:2024 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 January 2025, and conflicting national standards shall be withdrawn at the latest by January 2025.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

## **Endorsement notice**

The text of ISO 8529-3:2023, including corrected version 2023-09 has been approved by CEN as EN ISO 8529-3:2024 without any modification.

# INTERNATIONAL STANDARD

# ISO 8529-3

Second edition  
2023-06

Corrected version  
2023-09

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## Neutron reference radiation fields — Part 3: Calibration of area and personal dosimeters and determination of their response as a function of neutron energy and angle of incidence

*Champs de rayonnement neutronique de référence —*

*Partie 3: Étalonnage des dosimètres de zone et individuels et  
détermination de leur réponse en fonction de l'énergie et de l'angle  
d'incidence des neutrons*



Reference number  
ISO 8529-3:2023(E)

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# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Procedures applicable to area and personal dosimeters</b> .....	<b>2</b>
4.1 Neutron fields.....	2
4.2 Conversion coefficients.....	2
4.3 Determination of the response.....	3
4.4 Calibration procedures.....	3
<b>5 Procedures for calibrating and determining the ambient dose equivalent response of area dosimeters</b> .....	<b>4</b>
5.1 Quantity to be measured and conversion coefficients.....	4
5.2 Required response characteristics.....	4
5.3 Dosimeter conditions.....	4
5.4 Irradiation geometry.....	4
5.5 Evaluation of measurement.....	4
<b>6 Procedures for calibrating and determining the personal dose equivalent response of personal dosimeters</b> .....	<b>5</b>
6.1 Quantity to be measured and conversion coefficients.....	5
6.2 Required response characteristics.....	6
6.3 Calibration phantom.....	6
6.4 Dosimeter conditions.....	6
6.5 Irradiation geometry.....	6
6.6 Evaluation of measurement.....	7
<b>7 Uncertainty</b> .....	<b>8</b>
<b>Annex A (informative) List of reference conditions and standard test conditions</b> .....	<b>9</b>
<b>Bibliography</b> .....	<b>10</b>

## ISO 8529-3:2023(E)

### 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 documents 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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

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

This second edition cancels and replaces the first edition (ISO 8529-3:1998), which has been technically revised.

The main changes are as follows:

- The second and last edition of ISO 8529-1:2021 revised the neutron reference radiation fields produced with radionuclide sources as well as those produced with monoenergetic neutrons, thus requiring calculation of new conversion coefficients from neutron fluence to ambient dose equivalent or personal dose equivalent.

A list of all parts in the ISO 8529 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](http://www.iso.org/members.html).

This corrected version of ISO 8529-3:2023 incorporates the following corrections:

- The unit "pSv cm<sup>-2</sup>" was corrected to "pSv cm<sup>2</sup>" in [Tables 1](#) to [4](#).

## Introduction

This document is closely related to ISO 8529-1 and ISO 8529-2 concerning the calibration of dosimeters and doserate meters for neutron radiation. ISO 8529-1 specifies the reference neutron radiation fields, in the energy range from thermal up to 20 MeV, and their production methods. ISO 8529-2 describes the calibration fundamentals of radiation protection devices related to basic quantities characterising the radiation field and specifies the procedures to be used for realising the calibration conditions of radiation protection devices produced by calibration sources with emphasis on correction for extraneous effects.

This document deals with dosimeters for area and individual monitoring. Unless differently specified, the word "dosimeter" always refers to both. Area dosimeters are often called area monitors or area survey meters, and dosimeters for individual monitoring are often called personal dosimeters or personal dosimeters. This document describes procedures for calibrating and determining the response in terms of the International Commission on Radiation Units and Measurements (ICRU) operational quantities. These are defined in ICRU Report 39<sup>[1]</sup> and ICRU Report 51<sup>[2]</sup>. For radiation protection purposes, these operational quantities are considered to be a sufficiently accurate approximation to the protection quantities. For the purposes of this document, the emphasis will be on the evaluation of the operational quantities at 10 mm depth defined in the body using conversion coefficients in the appropriate phantom. Cold neutrons may present special problems in dosimetry and are outside the scope of this document, as are the photon calibrations of instruments designed to measure both photons and neutrons.

The determination of the response of dosimeters is essentially a three-step process. First, a primary quantity such as the neutron fluence is determined at the point of test. Second, the reference point of the device being calibrated is then placed at the point of test to determine the fluence response. Third, the response of the device with respect to the appropriate operational quantity is then determined by the application of conversion coefficients that relate the physical quantity (the fluence) to the operational quantity (the dose equivalent). This document describes the methods and the conversion coefficients to be used for the determination of the response of area and personal dosimeters in terms of the respective ICRU operational quantities for neutrons.

# Neutron reference radiation fields —

## Part 3:

# Calibration of area and personal dosimeters and determination of their response as a function of neutron energy and angle of incidence

## 1 Scope

This document provides guidance for those who calibrate protection-level dosimeters and doserate meters for area and individual monitoring with reference neutron radiation fields. This includes the determination of the response as a function of neutron energy and angle of incidence. The operational quantities recommended in ICRU Report 51<sup>[2]</sup> are considered. In addition to the description of procedures, this document includes appropriate definitions and conversion coefficients and provides guidance on the statement of measurement uncertainties.

## 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 8529-1, *Neutron reference radiations fields — Part 1: Characteristics and methods of production*

ISO 8529-2, *Reference neutron radiations — Part 2: Calibration fundamentals of radiation protection devices related to the basic quantities characterizing the radiation field*

ISO 12789-1, *Reference radiation fields — Simulated workplace neutron fields — Part 1: Characteristics and methods of production*

ISO 12789-2, *Reference radiation fields — Simulated workplace neutron fields — Part 2: Calibration fundamentals related to the basic quantities*

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)*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**