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Neutron reference radiations fields - Part 1: Characteristics and methods of production (ISO 8529-1:2021)

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Champs de rayonnement neutronique de référence - Partie 1: Caractéristiques et méthodes de production (ISO 8529-1:2021)

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Neutron reference radiations fields - Part 1: Characteristics and methods of production (ISO 8529- 1:2021)

Champs de rayonnement neutronique de référence -
Partie 1: Caractéristiques et méthodes de production
(ISO 8529-1:2021)

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European foreword

The text of ISO 8529-1:2021 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 8529-1:2023 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of an identical text or by endorsement, at the latest by January 2024, and conflicting national standards shall be withdrawn at the latest by January 2024.

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Endorsement notice

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8529-1

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**Neutron reference radiations fields —
Part 1:
Characteristics and methods of
production**

*Champs de rayonnement neutronique de référence —
Partie 1: Caractéristiques et méthodes de production*

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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 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).

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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.

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

A list of all the 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.

Introduction

This is the first of a set of three International Standards concerning the calibration of dosimeters and dose rate meters for neutron radiation for protection purposes. It describes the characteristics and methods of production of the neutron reference radiation fields to be used for calibrations. ISO 8529-2 describes fundamentals related to the physical quantities characterizing the radiation field and calibration procedures in general terms, with emphasis on active dose rate meters and the use of radionuclide sources. ISO 8529-3 deals with dosimeters for area and individual monitoring, describing the respective procedures for calibrating and determining the response in terms of the International Commission on Radiation Units and Measurements (ICRU) operational quantities. Conversion coefficients for converting neutron fluence into these operational quantities are provided in ISO 8529-3.

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Neutron reference radiations fields —

Part 1: Characteristics and methods of production

1 Scope

This document specifies the neutron reference radiation fields, in the energy range from thermal up to 20 MeV, for calibrating neutron-measuring devices used for radiation protection purposes and for determining their response as a function of neutron energy.

This document is concerned only with the methods of producing and characterizing the neutron reference radiation fields. The procedures for applying these radiation fields for calibrations are described in References [1] and [2].

The neutron reference radiation fields specified are the following:

- neutron fields from radionuclide sources, including neutron fields from sources in a moderator;
- neutron fields produced by nuclear reactions with charged particles from accelerators;
- neutron fields from reactors.

In view of the methods of production and use of them, these neutron reference radiation fields are divided, for the purposes of this document, into the following three separate clauses:

- In [Clause 4](#), radionuclide neutron sources with wide spectra are specified for the calibration of neutron-measuring devices. These sources should be used by laboratories engaged in the routine calibration of neutron-measuring devices, the particular design of which has already been type tested.
- In [Clause 5](#), accelerator-produced monoenergetic neutrons and reactor-produced neutrons with wide or quasi monoenergetic spectra are specified for determining the response of neutron-measuring devices as a function of neutron energy. Since these neutron reference radiation fields are produced at specialized and well-equipped laboratories, only the minimum of experimental detail is given.
- In [Clause 6](#), thermal neutron fields are specified. These fields can be produced by moderated radionuclide sources, accelerators, or reactors.

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

3 Terms and definitions

For the purposes of this document, the terms and definitions of ISO 29661 and the following apply:

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>