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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

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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 dosemeters 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 dosemeters 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.

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

