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

Champs de rayonnement neutronique de référence —

Partie 1: Caractéristiques et méthodes de production

**(<https://standards.iteh.ai>)
Document Preview**

[ISO 8529-1:2021](https://standards.iteh.ai/catalog/standards/iso/5cbcf9b-c53d-4acb-97b5-3c30b45a1a69/iso-8529-1-2021)

<https://standards.iteh.ai/catalog/standards/iso/5cbcf9b-c53d-4acb-97b5-3c30b45a1a69/iso-8529-1-2021>



iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 8529-1:2021](https://standards.iteh.ai/catalog/standards/iso/5cbcf9b-c53d-4acb-97b5-3c30b45a1a69/iso-8529-1-2021)

<https://standards.iteh.ai/catalog/standards/iso/5cbcf9b-c53d-4acb-97b5-3c30b45a1a69/iso-8529-1-2021>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Broad spectrum neutron reference radiation fields produced with radionuclide sources.....	3
4.1 Overview.....	3
4.2 Types of calibration sources.....	3
4.3 Source shape and encapsulation.....	4
4.4 Photon component of the neutron field.....	4
4.5 Energy distribution of neutron source emission rate.....	5
4.6 Neutron fluence rate produced by a source.....	5
4.7 Determination of the neutron source emission rate.....	6
4.8 Irradiation facility.....	6
5 Reference fields for the determination of the response of neutron-measuring devices as a function of neutron energy.....	7
5.1 Overview.....	7
5.2 General properties.....	7
5.3 Neutron reference radiation fields produced with particle accelerators.....	8
5.3.1 General requirements.....	8
5.3.2 Energy of charged particles.....	8
5.3.3 Neutron spectrum.....	9
5.3.4 Parasitic and scattered neutron background.....	9
5.3.5 Neutron fluence measurement and monitoring.....	10
5.4 Neutron reference radiation fields produced with reactors.....	10
5.4.1 General requirements.....	10
5.4.2 Production and monitoring.....	10
6 Thermal neutron reference radiation fields.....	10
Annex A (informative) Tabular and graphical representation of the neutron spectra for radionuclide sources.....	12
Annex B (normative) Energy distribution of the neutron emission rate for the ²⁵²Cf source.....	14
Annex C (informative) Characteristics of D₂O-moderated ²⁵²Cf sources.....	16
Annex D (informative) Characteristics of ²⁴¹Am-Be sources.....	20
Annex E (informative) Angular source emission rate characteristics of radionuclide neutron sources.....	24
Annex F (normative) Conventional thermal-neutron fluence rate.....	27
Bibliography.....	28

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).

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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.

iTeh Standards (<https://standards.iteh.ai>) Document Preview

[ISO 8529-1:2021](https://standards.iteh.ai/catalog/standards/iso/5cbcf9b-c53d-4acb-97b5-3c30b45a1a69/iso-8529-1-2021)

<https://standards.iteh.ai/catalog/standards/iso/5cbcf9b-c53d-4acb-97b5-3c30b45a1a69/iso-8529-1-2021>