

Neutronen-Referenzstrahlungsfelder - Teil 1: Charakteristika und Verfahren zur Erzeugung (ISO 8529-1:2021)

National Foreword

This European Standard EN ISO 8529-1:2023 was adopted as Luxembourgish Standard ILNAS-EN ISO 8529-1:2023.

Every interested party, which is member of an organization based in Luxembourg, can participate for FREE in the development of Luxembourgish (ILNAS), European (CEN, CENELEC) and International (ISO, IEC) standards:

- Participate in the design of standards
- Foresee future developments
- Participate in technical committee meetings

<https://portail-qualite.public.lu/fr/normes-normalisation/participer-normalisation.html>

THIS PUBLICATION IS COPYRIGHT PROTECTED

Nothing from this publication may be reproduced or utilized in any form or by any mean - electronic, mechanical, photocopying or any other data carries without prior permission!

ILNAS-EN ISO 8529-1:2023

EUROPEAN STANDARD **EN ISO 8529-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2023

ICS 17.240

English Version

**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)

This European Standard was approved by CEN on 16 July 2023.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

| Contents | Page |
|------------------------|------|
| European foreword..... | 3 |

ILNAS-EN ISO 8529-1:2023 - Preview only Copy via ILNAS e-Shop

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.

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.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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 8529-1:2021 has been approved by CEN as EN ISO 8529-1:2023 without any modification.

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

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



**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 |