



BSI Standards Publication

Radiological protection — Criteria and performance limits for the periodic evaluation of dosimetry services

National foreword

This British Standard is the UK implementation of EN ISO 14146:2021. It is identical to ISO 14146:2018. It supersedes BS ISO 14146:2018, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee NCE/2, Radiation protection and measurement.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2021
Published by BSI Standards Limited 2021

ISBN 978 0 539 14657 8

ICS 13.280

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2018.

Amendments/corrigenda issued since publication

Date	Text affected
28 February 2021	This corrigendum renumbers BS ISO 14146:2018 as BS EN ISO 14146:2021

EUROPEAN STANDARD

EN ISO 14146

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2021

ICS 13.280

English Version

**Radiological protection - Criteria and performance
limits for the periodic evaluation of dosimetry services
(ISO 14146:2018)**

Radioprotection - Critères et limites de
performance pour l'évaluation périodique des
services de dosimétrie (ISO 14146:2018)

Strahlenschutz - Kriterien und
Mindestanforderungen bei der
wiederkehrenden Überprüfung von
Dosismessstellen (ISO 11929-2:2019)

This European Standard was approved by CEN on 18 January 2021.

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, Turkey 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

European foreword

The text of ISO 14146:2018 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 14146:2021 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 August 2021, and conflicting national standards shall be withdrawn at the latest by August 2021.

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.

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, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 14146:2018 has been approved by CEN as EN ISO 14146:2021 without any modification.

Contents

Page

Foreword	iv
1 Scope	1
2 Normatives references	1
3 Terms and definitions	2
4 Quantities measured	4
5 Frequency of evaluation	4
6 Test conditions	4
6.1 Standard test conditions and special handling conditions.....	4
6.2 Radiation.....	4
6.3 Dose range.....	5
7 Performance limits	6
7.1 Limits.....	6
7.1.1 Personal and area dosimeters.....	6
7.1.2 Environmental dosimeters for Cs-137 and environmental radiation.....	7
7.2 Approval criterion.....	7
8 Operational procedures	7
8.1 Evaluation sample size.....	7
8.2 Evaluation procedure.....	7
8.3 Evaluation sequence.....	8
9 Test report	8
Annex A (informative) Graphical illustrations of the performance limits	10
Bibliography	12

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 the 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, *Radiological protection*.

This second edition of ISO 14146 cancels and replaces the first edition (ISO 14146:2000) of which it constitutes a technical revision. The main change with respect to the previous edition is the inclusion of beta and neutron radiation as well as eye, extremity and area dosimeters.

Radiological protection — Criteria and performance limits for the periodic evaluation of dosimetry services

1 Scope

The quality of a supplier of a dosimetry service depends on both the characteristics of the approved (type-tested) dosimetry system¹⁾ and the training and experience of the staff, together with the calibration procedures and quality assurance programmes.

This document specifies the criteria and the test procedures to be used for the periodic verification of the performance of dosimetry services supplying personal and/or area dosimeters.

An area dosimeter can be a workplace dosimeter or an environmental dosimeter.

The performance evaluation can be carried out as a part of the approval procedure for a dosimetry system or as an independent check to verify that a dosimetry service fulfils specified national or international type test performance requirements under representative exposure conditions that are expected or mimic workplace fields from the radiological activities being monitored.

This document applies to personal and area dosimeters for the assessment of external photon radiation with a (fluence weighted) mean energy between 8 keV and 10 MeV, beta radiation with a (fluence weighted) mean energy between 60 keV and 1,2 MeV, and neutron radiation with a (fluence weighted) mean energy between 25,3 meV (i.e. thermal neutrons with a Maxwellian energy distribution with $kT = 25,3$ meV) and 200 MeV.

It covers all types of personal and area dosimeters needing laboratory processing (e.g. thermoluminescent, optically stimulated luminescence, radiophotoluminescent, track detectors or photographic-film dosimeters) and involving continuous measurements or measurements repeated regularly at fixed time intervals (e.g. several weeks, one month).

Active dosimeters (for dose measurement) may also be treated according to this document. Then, they should be treated as if they were passive (i.e. the dosimetry service reads their indicated values and reports them to the evaluation organization).

2 Normatives 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 4037-1, *X and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy — Part 1: Radiation characteristics and production methods*

ISO 6980-1, *Nuclear energy — Reference beta-particle radiation — Part 1: Methods of production*

ISO 8529-1, *Reference neutron radiations — Part 1: Characteristics and methods of production*

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

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

1) If this document is applied to a dosimetry system for which no approval (pattern or type test) has been provided, then in the following text approval or type test should be read as the technical data sheet provided by the manufacturer or as the data sheet required by the regulatory authority.