Irish Standard
I.S. EN ISO 29661:2017

Reference radiation fields for radiation protection - Definitions and fundamental concepts (ISO 29661:2012, including Amd 1:2015)

I.S. EN ISO 29661:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:	*Published:*
EN ISO 29661:2017	2017-10-18

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2017-11-05	13.280
	NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN ISO 29661:2017 is the adopted Irish version of the European Document EN ISO 29661:2017, Reference radiation fields for radiation protection - Definitions and fundamental concepts (ISO 29661:2012, including Amd 1:2015)

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

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 29661

October 2017

ICS 13.280

English Version

Reference radiation fields for radiation protection - Definitions and fundamental concepts (ISO 29661:2012, including Amd 1:2015)

Champs de rayonnement de référence pour la radioprotection - Définitions et concepts fondamentaux (ISO 29661:2012, y compris Amd 1:2015)

This European Standard was approved by CEN on 13 September 2017.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword

The text of ISO 29661:2012, including Amd 1:2015 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 29661:2017 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 April 2018, and conflicting national standards shall be withdrawn at the latest by April 2018.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 29661:2012, including Amd 1:2015 has been approved by CEN as EN ISO 29661:2017 without any modification.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 29661 was prepared by Technical Committee ISO/TC 85, *Nuclear energy, nuclear technologies, and radiological protection*, Subcommittee SC 2, *Radiological protection*.

Introduction

International Standards ISO 4037, ISO 6980, ISO 8529 and ISO 12789[1]...[12], with focus on photon, beta and neutron reference radiation fields, are each divided into several parts: one part gives the methods of production and characterization of reference radiation fields, and others describe the dosimetry of the reference radiation qualities and the procedures for calibrating and determining the response of dosemeters and doserate meters in terms of the operational quantities of the International Commission on Radiation Units and Measurements (ICRU)[25] [26] [27] [28] [31].

The subject of these four International Standards is the same; they differ only in the kind of radiation each addresses. Their terms and definitions, and most of the descriptions of methods and procedures given are basically the same — whatever the radiation. Nevertheless, they do differ, more or less, from one to the other in detail. This International Standard brings together terms and definitions and fundamental concepts common to all of them. Thus, it serves to harmonize International Standards on radiation protection.

Besides definitions relating to calibration primary quantities, the operational quantities for area and individual monitoring are specified. For area monitoring, the operational quantities are ambient dose equivalent, $H^*(10)$, directional dose equivalents, $H'(0{,}07,\vec{\Omega})$ and $H'(3,\vec{\Omega})$, and the appropriate dose rates. For individual monitoring using personal dosemeters, the dose equivalent quantities, $H_p(10)$, $H_p(0{,}07)$ and $H_p(3)$, and the respective dose rates are available.

The method used to represent these operational quantities is the following. First, a basic (primary) quantity, such as air kerma free-in-air, fluence or absorbed dose to soft tissue, is measured. Then the appropriate operational quantity is derived by the application of the conversion coefficient that relates the basic (primary) quantity to the selected operational quantity. The procedure for the calibration and the determination of the response of radiation protection dosemeters is described in general terms. Depending on the type of dosemeter under test, the position of the reference point is specified differently and the irradiation is either carried out on a phantom (for personal dosemeters) or free in air (for area dosemeters or area survey meters).

With the publication of this International Standard, it is intended that ISO 4037, ISO 6980, ISO 8529 and ISO 12789 be revised successively for further harmonization since, among other aspects, certain of their definitions differ from those published here and the symbols chosen for this International Standard are more consistent with ICRU reports and other International Standards used for radiation protection purposes.

Reference radiation fields for radiation protection — Definitions and fundamental concepts

1 Scope

This International Standard defines terms and fundamental concepts for the calibration of dosemeters and equipment used for the radiation protection dosimetry of external radiation — in particular, for beta, neutron and photon radiation. It defines the measurement quantities for radiation protection dosemeters and doserate meters and gives recommendations for establishing these quantities. For individual monitoring, it covers whole body and extremity dosemeters (including those for the skin and the eye lens), and for area monitoring, portable and installed dosemeters. Guidelines are given for the calibration of dosemeters and doserate meters used for individual and area monitoring in reference radiation fields. Recommendations are made for the position of the reference point and the phantom to be used for personal dosemeters.

This International Standard also deals with the determination of the response as a function of radiation quality and angle of radiation incidence.

It is intended to be used by calibration laboratories and manufacturers.

2 Normative references

The following referenced documents are indispensable for the application 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/IEC Guide 98-3:2008, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

ISO/IEC 17025:2005, *General requirements for the competence of testing and calibration laboratories.* Corrected by ISO/IEC 17025:2005/Cor 1:2006

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE These terms and definitions are relevant for the calibration of dosemeters and for the quantities and conversion coefficients that are general to ISO 4037, ISO 6980, ISO 8529 and ISO 12789. Special terms and definitions can be found in those International Standards.

3.1 General

3.1.1
angle of radiation incidence
α
angle, in the coordinate system of the dosemeter, between the direction of radiation incidence and the reference direction of the dosemeter in unidirectional fields

3.1.2
area dosemeter
area survey meter
meter designed to measure the ambient dose equivalent (rate) or the directional dose equivalent (rate)

[SOURCE: IEV 394-22-08, modified.]