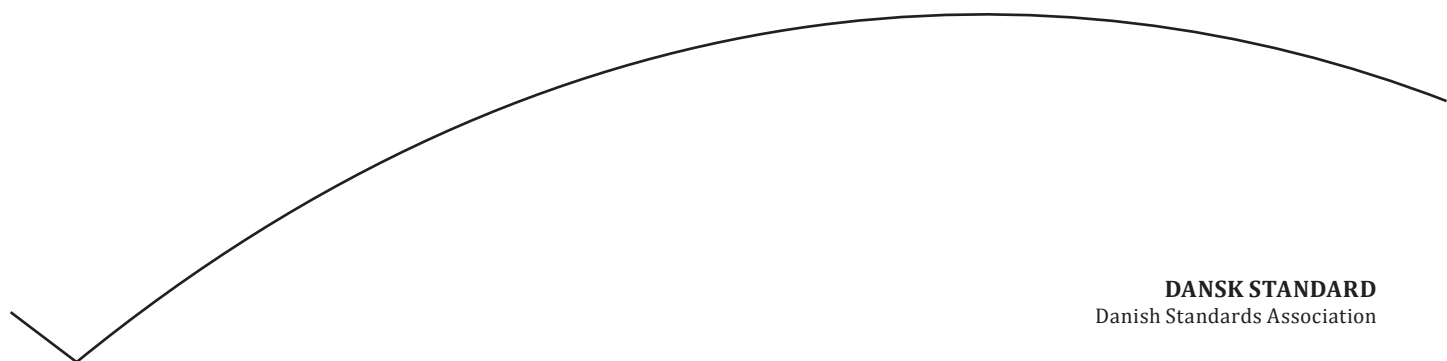


Beskyttelse mod stråling – Monitorering af arbejdstagere erhvervsmæssigt udsatte for risiko for intern kontamination med radioaktivt materiale

Radiation protection – Monitoring of workers occupationally exposed to a risk of internal contamination with radioactive material (ISO 20553:2006)



DANSK STANDARD
Danish Standards Association

Göteborg Plads 1
DK-2150 Nordhavn

Tel: +45 39 96 61 01

Tel: +45 39 96 61 01

dansk.standard@ds.dk

www.ds.dk

DS projekt: M313861

ICS: 13.280

Første del af denne publikations betegnelse er:

DS/EN ISO, hvilket betyder, at det er en international standard, der har status både som europæisk og dansk standard.

Denne publikations overensstemmelse er:

IDT med: ISO 20553:2006

IDT med: EN ISO 20553:2017

DS-publikationen er på engelsk.

DS-publikationstyper

Dansk Standard udgiver forskellige publikationstyper.

Typen på denne publikation fremgår af forsiden.

Der kan være tale om:

Dansk standard

- standard, der er udarbejdet på nationalt niveau, eller som er baseret på et andet lands nationale standard, eller
- standard, der er udarbejdet på internationalt og/eller europæisk niveau, og som har fået status som dansk standard

DS-information

- publikation, der er udarbejdet på nationalt niveau, og som ikke har opnået status som standard, eller
- publikation, der er udarbejdet på internationalt og/eller europæisk niveau, og som ikke har fået status som standard, fx en teknisk rapport, eller
- europæisk præstandard

DS-håndbog

- samling af standarder, eventuelt suppleret med informativt materiale

DS-hæfte

- publikation med informativt materiale

Til disse publikationstyper kan endvidere udgives

- tillæg og rettelsesblade

DS-publikationsform

Publikationstyperne udgives i forskellig form som henholdsvis

- | | |
|------------------------|---|
| • fuldtekstpublikation | (publikationen er trykt i sin helhed) |
| • godkendelsesblad | (publikationen leveres i kopi med et trykt DS-omslag) |
| • elektronisk | (publikationen leveres på et elektronisk medie) |

DS-betegnelse

Alle DS-publikationers betegnelse begynder med DS efterfulgt af et eller flere præfikser og et nr., fx **DS 383**, **DS/EN 5414** osv. Hvis der efter nr. er angivet et **A** eller **Cor**, betyder det, enten at det er et **tillæg** eller et **rettelsesblad** til hovedstandard, eller at det er indført i hovedstandard.

DS-betegnelse angives på forsiden.

Overensstemmelse med anden publikation:

Overensstemmelse kan enten være IDT, EQV, NEQ eller MOD

- | | |
|---------------|---|
| • IDT: | Når publikationen er identisk med en given publikation. |
| • EQV: | Når publikationen teknisk er i overensstemmelse med en given publikation, men præsentationen er ændret. |
| • NEQ: | Når publikationen teknisk eller præsentationsmæssigt ikke er i overensstemmelse med en given standard, men udarbejdet på baggrund af denne. |
| • MOD: | Når publikationen er modificeret i forhold til en given publikation. |

EUROPÄISCHE NORM

October 2017

ICS 13.280

English Version

**Radiation protection - Monitoring of workers
occupationally exposed to a risk of internal contamination
with radioactive material (ISO 20553:2006)**

Radioprotection - Surveillance professionnelle des
travailleurs exposés à un risque de contamination
interne par des matériaux radioactifs (ISO
20553:2006)

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

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, 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 United Kingdom.



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

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

This is a preview of "DS/EN ISO 20553:2017". [Click here to purchase the full version from the ANSI store.](#)

Contents	Page
European foreword.....	3

This is a preview of "DS/EN ISO 20553:2017". [Click here to purchase the full version from the ANSI store.](#)

European foreword

The text of ISO 20553:2006 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 20553:2017 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 20553:2006 has been approved by CEN as EN ISO 20553:2017 without any modification.

This is a preview of "DS/EN ISO 20553:2017". [Click here to purchase the full version from the ANSI store.](#)

First edition
2006-04-15

Radiation protection — Monitoring of workers occupationally exposed to a risk of internal contamination with radioactive material

Radioprotection — Surveillance professionnelle des travailleurs exposés à un risque de contamination interne par des matériaux radioactifs



Reference number
ISO 20553:2006(E)

© ISO 2006

This is a preview of "DS/EN ISO 20553:2017". [Click here to purchase the full version from the ANSI store.](#)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO 2006

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

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

This is a preview of "DS/EN ISO 20553:2017". Click [here](#) to purchase the full version from the ANSI store.

Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Normative references	2
3 Terms and definitions.....	2
3.1 Absorption types	2
4 Symbols and abbreviated terms	6
5 Purpose and need for monitoring programmes	6
6 Reference levels.....	8
7 Routine monitoring programmes	9
7.1 General aspects	9
7.2 Workplace monitoring	10
7.3 Individual monitoring	10
7.4 Methods and time intervals	11
8 Special monitoring programmes.....	14
8.1 General aspects	14
8.2 Workplace monitoring	14
8.3 Individual monitoring	15
9 Task-related monitoring programmes	17
9.1 General aspects	17
9.2 Workplace monitoring	17
9.3 Individual monitoring	17
10 Special cases of individual monitoring	18
10.1 Actinides.....	18
10.2 Contamination in wounds.....	18
10.3 Contamination on the skin.....	18
11 Recording, documentation and reporting.....	18
11.1 Recording and documentation.....	18
11.2 Reporting	20
12 Quality management.....	20
Bibliography	22

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 20553 was prepared by Technical Committee ISO/TC 85, *Nuclear energy*, Subcommittee SC 2, *Radiation protection*.

This is a preview of "DS/EN ISO 20553:2017". [Click here to purchase the full version from the ANSI store.](#)

Introduction

In the course of employment, individuals might work with radioactive materials that, under certain circumstances, could be taken into the body. Protecting workers against risks of incorporated radionuclides requires the monitoring of potential intakes and/or the quantification of actual intakes and exposures. The selection of measures and programmes for this purpose requires decisions concerning methods, techniques, frequencies etc. for measurements and dose assessment. The criteria permitting the evaluation of the necessity of such a monitoring programme or for the selection of methods and frequencies of monitoring usually depend upon the legislation, the purpose of the radiation protection programme, the probabilities of potential radionuclide intakes, and the characteristics of the materials handled.

This International Standard offers guidance for the decision whether a monitoring programme is required and how it should be designed. Its intention is to optimise the efforts for such a monitoring programme consistent with legal requirements and with the purpose of the radiation protection programme. Recommendations of international expert bodies and international experience with the practical application of these recommendations in radiation protection programmes have been considered in the development of this International Standard. Its application facilitates the exchanges of information between authorities, supervisory institutions and employers. The International Standard is not a substitute for legal requirements.

In the International Standard, the word “shall” is used to denote a requirement and no deviation is allowed. The word “should” is used to denote a recommendation from which justified deviations are allowed. The word “may” is used to denote permission.

This is a preview of "DS/EN ISO 20553:2017". [Click here to purchase the full version from the ANSI store.](#)

Radiation protection — Monitoring of workers occupationally exposed to a risk of internal contamination with radioactive material

1 Scope

This International Standard specifies the minimum requirements for the design of professional programmes to monitor workers exposed to the risk of internal contamination by radioactive substances and establishes principles for the development of compatible goals and requirements for monitoring programmes.

This International Standard addresses the

- a) purposes of monitoring and of monitoring programmes;
- b) description of the different categories of monitoring programmes;
- c) quantitative criteria for conducting monitoring programmes;
- d) suitable methods for monitoring and criteria for their selection;
- e) information that has to be collected for the design of a monitoring programme;
- f) general requirements for monitoring programmes (e.g. detection limits, tolerated uncertainties);
- g) frequencies of measurements;
- h) special cases;
- i) quality assurance; and
- j) documentation, reporting, record-keeping.

This International Standard does not address

- the monitoring of exposure to radon and its radioactive decay products;
- detailed descriptions of measuring methods and techniques;
- detailed procedures for *in vivo* measurements and *in vitro* analyses;
- interpretation of monitoring results in terms of doses;
- biokinetic data and mathematical models for converting measured activities into absorbed dose, equivalent dose and effective dose; or
- the investigation of the causes or implications of an exposure or intake.

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 5725-1:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions*

ISO 12790-1:2001, *Radiation protection — Performance criteria for radiobioassay — Part 1: General principles*

BIPM/IEC/IFCC/ISO/IUPAC/IUPAP/OIML, *International vocabulary of basic and general terms in metrology (VIM)*, 1993

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5725-1, ISO 12790-1 and *International vocabulary of basic and general terms in metrology (VIM)* and the following apply.

3.1 Absorption types

3.1.1 type F F

deposited materials that have high (fast) rates of absorption into body fluids from the respiratory tract

3.1.2 type M M

deposited materials that have intermediate (moderate) rates of absorption into body fluids from the respiratory tract

3.1.1 type S S

deposited materials that have low (slow) rates of absorption into body fluids from the respiratory tract

3.2 accuracy of measurement

characteristics of an analysis or determination that ensure that both the bias and precision of the resulting quantity remains within specified limits

3.3 activity transition rate

NOTE The activity is stated in becquerels (Bq).

3.4 activity median aerodynamic diameter AMAD

value of aerodynamic diameter such that 50 % of the airborne activity in a specified aerosol is associated with particles smaller than the AMAD, and 50 % of the activity is associated with particles larger than the AMAD

NOTE The aerodynamic diameter of an airborne particle is the diameter that a sphere of unit density would need to have in order to have the same terminal velocity when settling in air as the particle of interest.