



Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN ISO 12183:2019

Nuclear fuel technology - Controlled- potential coulometric assay of plutonium (ISO 12183:2016)

Kernbrennstofftechnologie -
Coulometrische Bestimmung von
Plutonium mit kontrolliertem Potential
(ISO 12183:2016)

Technologie du combustible nucléaire -
Dosage du plutonium par coulométrie à
potentiel imposé (ISO 12183:2016)

06/2019



National Foreword

This European Standard EN ISO 12183:2019 was adopted as Luxembourgish Standard ILNAS-EN ISO 12183:2019.

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 12183:2019

EUROPEAN STANDARD **EN ISO 12183**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2019

ICS 27.120.30

English Version

**Nuclear fuel technology - Controlled-potential coulometric
assay of plutonium (ISO 12183:2016)**

Technologie du combustible nucléaire - Dosage du
plutonium par coulométrie à potentiel imposé (ISO
12183:2016)

Kernbrennstofftechnologie - Coulometrische
Bestimmung von Plutonium mit kontrolliertem
Potential (ISO 12183:2016)

This European Standard was approved by CEN on 8 March 2019.

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: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	3

European foreword

The text of ISO 12183:2016 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 12183:2019 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 December 2019, and conflicting national standards shall be withdrawn at the latest by December 2019.

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 12183:2016 has been approved by CEN as EN ISO 12183:2019 without any modification.

Nuclear fuel technology — Controlled-potential coulometric assay of plutonium

Technologie du combustible nucléaire — Dosage du plutonium par coulométrie à potentiel imposé



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, 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
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	1
5 Reagents	2
6 Apparatus	2
7 Procedure	8
7.1 Plutonium determination	8
7.1.1 Weighing the test sample, with an uncertainty of $\pm 0,01$ %, $K = 1$	8
7.1.2 Preparation of the test sample	9
7.1.3 Electrode pre-treatment	9
7.1.4 Electrical calibration of the current integration system	10
7.1.5 Formal potential determination	11
7.1.6 Coulometric blank determination	12
7.1.7 Plutonium measurement	13
7.2 Analysis of subsequent test samples	13
8 Expression of results	14
8.1 Calculation of the electrical calibration factor	14
8.2 Calculation of the blank	14
8.3 Fraction of electrolysed plutonium	15
8.4 Plutonium content	16
8.5 Quality control	16
9 Characteristics of the method	16
9.1 Repeatability	16
9.2 Confidence interval	17
9.3 Analysis time	17
10 Interferences	17
11 Procedure variations and optimization	21
11.1 Accountability measurements and reference material preparation	21
11.2 Process control measurements	21
11.3 Measurement cell design	21
11.4 Electrolyte and electrode options	22
11.5 Test sample size	22
11.6 Background current corrections	22
11.7 Correction for iron	23
11.8 Control-potential adjustment	24
11.9 Calibration methodologies	24
Annex A (normative) Purification by anion-exchange separation	25
Annex B (normative) Determination of formal potential, E_0	27
Bibliography	28