Nuclear energy - Nuclear fuel technology - Determination of plutonium in nitric acid solutions by spectrophotometry (ISO 9463:2019)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 9463:2021 sisaldab Euroopa standardi EN ISO 9463:2021 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 9463:2021 consists of the English text of the European standard EN ISO 9463:2021.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 10.02.2021.	Date of Availability of the European standard is 10.02.2021.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 27.120.30

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 9463

February 2021

ICS 27.120.30

English Version

Nuclear energy - Nuclear fuel technology - Determination of plutonium in nitric acid solutions by spectrophotometry (ISO 9463:2019)

Énergie nucléaire - Technologie du combustible nucléaire - Détermination du plutonium dans les solutions d'acide nitrique par spectrophotométrie (ISO 9463:2019)

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

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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.

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

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Ref. No. EN ISO 9463:2021 E

European foreword

The text of ISO 9463:2019 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 9463:2021 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.

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Endorsement notice

The text of ISO 9463:2019 has been approved by CEN as EN ISO 9463:2021 without any modification.

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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).

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For an explanation of the voluntary nature of 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 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 5, *Nuclear installations, processes and technologies*.

This third edition cancels and replaces the second edition (ISO 9463:2009), which has been technically revised. The main change compared to the previous edition is the use of silver (II) oxide powder for the plutonium valence adjustment.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Nuclear energy — Nuclear fuel technology — Determination of plutonium in nitric acid solutions by spectrophotometry

1 Scope

This document specifies an analytical method by spectrophotometry, for determining the plutonium concentration in nitric acid solutions, with spectrophotometer implemented in hot cell and glove box allowing the analysis of high activity solutions. Commonly, the method is applicable, without interference, even in the presence of numerous cations, for a plutonium concentration higher than 0,5 mg·l^{-1} in the original sample with a standard uncertainty, with coverage factor k = 1, less than 5 %.

The method is intended for process controls at the different steps of the process in a nuclear fuel reprocessing plant or in other nuclear facilities.

2 Normative 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 1042, *Laboratory glassware — One-mark volumetric flasks*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

Plutonium is quantitatively oxidized to the hexavalent state either with cerium (IV) or with silver oxide. The excess of silver oxide is destroyed by the addition of sulfamic acid. The optical density of the plutonium (VI) (PuO_2^{2+}) absorption peak at the wavelength of 831 nm is then measured on a spectrophotometer. The result is obtained by comparison to a calibration performed under similar conditions (with the same nitrate content).

5 Chemical conditions

5.1 Stability of Pu(VI)

Pu(VI) is very stable under the operating conditions of the method over the range 2 mol·l^{-1} < c(H$^+$) < 5 mol·l^{-1}.