

Nuclear energy - Determination of Gd₂O₃ content in pellets containing uranium oxide by X-ray fluorescence spectrometry (ISO 16795:2024)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>See Eesti standard EVS-EN ISO 16795:2025 sisaldab Euroopa standardi EN ISO 16795:2025 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 20.08.2025.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN ISO 16795:2025 consists of the English text of the European standard EN ISO 16795:2025.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 20.08.2025.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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English Version

Nuclear energy - Determination of Gd_2O_3 content in pellets containing uranium oxide by X-ray fluorescence spectrometry (ISO 16795:2024)

Énergie nucléaire - Détermination de la teneur de Gd_2O_3 par spectrométrie à fluorescence X dans des pastilles combustibles contenant de l'oxyde d'uranium (ISO 16795:2024)

Kerntechnik - Bestimmung des Gadoliniumoxidgehalts in Gadolinium-Brennstofftabletten mittels Röntgenfluoreszenzspektrometrie (ISO 16795:2024)

This European Standard was approved by CEN on 11 August 2025.

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

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European foreword

The text of ISO 16795:2024 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 16795:2025 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of an identical text or by endorsement, at the latest by February 2026, and conflicting national standards shall be withdrawn at the latest by February 2026.

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 16795:2024 has been approved by CEN as EN ISO 16795:2025 without any modification.

Contents

	Page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	1
5 Apparatus	1
6 Reagents	2
7 Preparation of standards	2
8 Polishing	3
9 Equipment calibration	3
9.1 Angle calibration.....	3
9.2 Pulse-height distribution.....	3
9.3 Background correction.....	3
9.4 Stability (sensitivity) check.....	3
10 Calibration curve	4
11 Measurements	4
12 Precision and accuracy	4
13 Test report	4
Annex A (informative) Angle calibration and background correction	6
Annex B (informative) Precision and accuracy	7
Bibliography	8

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 document 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 second edition cancels and replaces the first edition (ISO 16795:2004), which has been technically revised.

The main changes are as follows:

- the title of this document has been modified;
- requirements for the standard pellet has been added in [Clause 7](#);
- range of Gd₂O₃ content covered by calibration curve has been added in [Clause 10](#);

A list of all parts in the ISO 16795 series can be found on the ISO website.

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Nuclear energy — Determination of Gd₂O₃ content in pellets containing uranium oxide by X-ray fluorescence spectrometry

1 Scope

This document specifies a method which covers the determination of Gd₂O₃ content in UO₂ fuel pellets, by X-ray fluorescence spectrometry.

Either wave dispersion X-ray fluorescence (WD-XRF) or energy dispersion X-ray fluorescence (ED-XRF) is applicable, however, this document states a method by using WD-XRF using Gd L α -line.

This method has been tested for mass fractions of from 2 % to 10 % Gd₂O₃.

2 Normative references

ISO 17034, *General requirements for the competence of reference material producers*

ASTM C1128, *Standard Guide for Preparation of Working Reference Materials for Use in Analysis of Nuclear Fuel Cycle Materials*

3 Terms and definitions

No terms and definitions are listed in this document.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Principle

The fuel pellets are polished before X-ray examination.

After excitation by the primary X-ray beam, the sample emits characteristic radiation from all of its components.

The appropriate 2θ angle (2-theta) for gadolinium is selected, for example 61,115 (2θ in degrees).

The digitized signal intensity (in terms of counts) of the selected L X-ray line is proportional to the concentration of gadolinium in the sample.

The process is fully automatic.

5 Apparatus

5.1 **Sequential X-ray spectrometer**, including the following:

5.1.1 **Compact microprocessor-controlled spectrometer.**

5.1.2 **Precision-engineered goniometer.**