
**Nuclear Energy — Fuel technology —
Determination of the O/M ratio in MOX
pellets by the gravimetric method**

*Énergie nucléaire — Technologie du combustible — Détermination
du rapport O/M dans les pastilles MOX par la méthode gravimétrique*





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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 on 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 the following URL: www.iso.org/iso/foreword.html.

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This second edition cancels and replaces the first edition (ISO 21484:2008), which has been technically revised.

Nuclear Energy — Fuel technology — Determination of the O/M ratio in MOX pellets by the gravimetric method

1 Scope

This document describes a method for determining the Oxygen-to-Metal (O/M) ratio in mixed uranium-plutonium oxide (U,Pu)O_{2 ± X} pellets. The parameters given in the following paragraphs are relevant for pellets within a range of O/M ratio corresponding to 1,98 to 2,01. The method described in the document is adapted, with regard to the parameters, if the expected values of O/M ratio are outside the range.

2 Normative references

There are no normative references in this document.

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 <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Principle

The (U,Pu)O_{2 ± X} sample is submitted to controlled oxidation-reduction under thermodynamic conditions designed to change the O/M ratio to a value of 2,000. The initial stoichiometric deviation, *X*, is determined from the sample mass difference before and after heat treatment.

5 Reactions

The main reactions are as follows:

- a) (U,Pu)O_{2 ± X ± x/2 O₂} → (U,Pu)O_{2,000};
- b) (U,Pu)O_{2+x} + xH₂ → (U,Pu)O_{2,000} + xH₂O.

6 Reagents and materials

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and distilled or demineralized water or water of equivalent purity.

6.1 Nitric acid solution, 50 % per volume nitric acid aqueous solution.

6.2 Purge gas.

6.2.1 Air, a volume fraction of 99,99 % purity grade is recommended.

6.2.2 Inert gas, such as Argon or nitrogen can be used with a recommended volume fraction of 99,99 % purity grade [O₂ < 0,000 5 % (5 ppm), H₂O < 0,000 5 % (5 ppm), N₂ < 0,000 5 % (5 ppm)].