

STANDARD

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Validation of the strength of reference solutions used for measuring concentrations

*Vérification du titre des solutions de référence utilisées pour la mesure des
concentrations*



Reference number
ISO 10980:1995(E)

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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.

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.

International Standard ISO 10980 was prepared by Technical Committee ISO/TC 85, *Nuclear energy*, Subcommittee SC 5, *Nuclear fuel technology*.

Annexes A, B and C form an integral part of this International Standard. Annexes D, E, F, G, H and J are for information only.

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Validation of the strength of reference solutions used for measuring concentrations

1 Scope

The reference solutions used for the standardization of analytical methods are the means through which the final result of the analysis is traceable to the basic units and to their standards.

The strength of these solutions should therefore be traceable to these same units with a relative accuracy of $\pm 0,1$ % or better.

This International Standard specifies procedures for preparing reference solutions, as well as a set of procedures for ensuring the quality of their preparation and the degree of accuracy of the solution strength.

It is intended to be a working document for analytical chemists. The underlying statistical theory is therefore not presented in full details or rigorously, in order to simplify application.

Sufficient details are included in annex H, in order to implement the procedure step by step in a laboratory environment.

2 Principle

Uranium, plutonium and potassium dichromate reference solutions are prepared independently.

These reference solutions are prepared exclusively from certified reference materials or from materials which have been analysed by at least two independent methods. Exactly weighed quantities of these materials are dissolved quantitatively and the solutions thus obtained are themselves weighed exactly.

The solution strengths are calculated from weighing data and from the known composition of the source materials.

The accuracy of their preparation is checked by comparing these solutions between themselves with the help of analytical methods so that the relative difference Δ between A_c , the strength calculated for these solutions, and A_m , the mean of replicate measurements, does not exceed 0,1 %.

Two categories of reference solutions can be distinguished according to the quality of the materials used in their preparation:

- primary reference solutions;
- secondary reference solutions.

3 Primary reference solutions

Primary reference solutions are prepared from reference materials which are distributed by approved organizations certifying their composition with a relative uncertainty of 0,05 % or better, corresponding to the confidence interval for a probability level of 95 %.