
**Water quality — Estimation of
measurement uncertainty based on
validation and quality control data**

*Qualité de l'eau — Estimation de l'incertitude de mesure basée sur des
données de validation et de contrôle qualité*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

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Introduction

The basic principles of the estimation of measurement uncertainty are set out in ISO/IEC Guide 98-3. There are several ways of estimating measurement uncertainty depending on the purpose of the estimation and the available data; Eurolab TR 1^[9] gives an overview of the main approaches.

This International Standard specifies a set of procedures to enable laboratories to estimate the measurement uncertainty of their results, using an approach based on quality control results and validation data. It is structured in a way that is applicable to analysts that do not have a thorough understanding of metrology or statistics.

NEN 7779^[8] and Nordtest TR 537^[10] have been used as a basis for developing this International Standard. The approach taken is “top-down”, contrary to the mainly “bottom-up” strategy adopted in ISO/IEC Guide 98-3.

It is statistically acceptable to combine a precision estimate and the uncertainty associated with the bias into one uncertainty measure. The sources of data for this approach are method validation and analytical quality control. The experimental approach specified in this International Standard enables a greater coverage of the sources of variation observed during routine use of the analytical method.

Water quality — Estimation of measurement uncertainty based on validation and quality control data

1 Scope

This International Standard specifies methods for the estimation of measurement uncertainty of chemical and physicochemical methods in single laboratories based on validation data and analytical quality control results obtained within the field of water analysis.

NOTE 1 The principles of the estimation of uncertainty specified in this International Standard are consistent with the principles described in ISO/IEC Guide 98-3.

In this International Standard, the quantification of measurement uncertainty relies on performance characteristics of a measurement procedure obtained from validation and the results of internal and external quality control.

NOTE 2 The approaches specified in this International Standard are mainly based on QUAM^[11], NEN 7779^[8], Nordtest TR 537^[10], and Eurolab TR 1^[9].

NOTE 3 This International Standard only addresses the evaluation of measurement uncertainty for results obtained from quantitative measurement procedures. The uncertainties associated with results obtained from qualitative procedures are not considered.

2 Normative references

The following referenced documents are indispensable for the application 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/IEC Guide 98-3:2008, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE 1 The terms and definitions listed are generally reproduced without the Notes which are associated with the terms and definitions in the respective references.

NOTE 2 The terms concerning precision data from interlaboratory trials are taken from ISO 3534-2:2006^[1] because the definitions in ISO/IEC Guide 99:2007^[7] are wider than those in ISO 3534-2:2006 as they include different measurement procedures, which is not appropriate for this International Standard.

3.1

trueness

closeness of agreement between the average of an infinite number of replicate measured quantity values and a reference quantity value

[ISO/IEC Guide 99:2007^[7], 2.14]

3.2

precision

closeness of agreement between indications or measured quantity values obtained by replicate measurements on the same or similar objects under specified conditions

[ISO/IEC Guide 99:2007^[7], 2.15]