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**Water quality — Guidance on analytical  
quality control for chemical and  
physicochemical water analysis**

*Qualité de l'eau — Lignes directrices pour le contrôle de qualité  
analytique pour l'analyse chimique et physicochimique de l'eau*



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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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 13530 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*.

This first edition of ISO/TS 13530 cancels and replaces ISO/TR 13530:1997, which has been technically revised.

# Water quality — Guidance on analytical quality control for chemical and physicochemical water analysis

## 1 Scope

This Technical Specification provides comprehensive guidance on within-laboratory and between-laboratory quality control for ensuring the production of results with a known level of accuracy in the analysis of waters.

This Technical Specification is applicable to the chemical and physicochemical analysis of all types of waters. It is not intended for application to the analysis of sludges and sediments (although many of its general principles are applicable to such analysis) and it does not address the biological or microbiological examination of water. Whilst sampling is an important aspect, this is only briefly considered.

Analytical quality control, as described in this Technical Specification, is intended for application to water analysis carried out within a quality-assurance programme. This Technical Specification does not address the detailed requirements of quality assurance for water analysis, which can be found in the EURACHEM/CITAC Guide (2002) [20].

The recommendations of this Technical Specification are in agreement with the requirements of established quality-assurance documentation (e.g. ISO/IEC 17025).

This Technical Specification is applicable to the use of all analytical methods within its field of application, although its detailed recommendations may require interpretation and adaptation to deal with certain types of determinands (for example, non-specific determinands, such as suspended solids or biochemical oxygen demand, BOD). In the event of any disparity between the recommendations of this Technical Specification and the requirements of a standard method of analysis, the requirements of the method should prevail.

## 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 3534-2:2006, *Statistics — Vocabulary and symbols — Part 2: Applied statistics*

ISO 5725 (all parts), *Accuracy (trueness and precision) of measurement methods and results*

ISO 8466-1, *Water quality — Calibration and evaluation of analytical methods and estimation of performance characteristics — Part 1: Statistical evaluation of the linear calibration function*

ISO 8466-2, *Water quality — Calibration and evaluation of analytical methods and estimation of performance characteristics — Part 2: Calibration strategy for non-linear second-order calibration functions*

ISO 13528:2005, *Statistical methods for use in proficiency testing by interlaboratory comparisons*

ISO/IEC 17025:2005, *General requirements for the competence of testing and calibration laboratories*

ISO Guide 35, *Reference materials — General and statistical principles for certification*

ISO/IEC Guide 43-1, *Proficiency testing by interlaboratory comparisons — Part 1: Development and operation of proficiency testing schemes*

ISO/IEC Guide 43-2, *Proficiency testing by interlaboratory comparisons — Part 2: Selection and use of proficiency testing schemes by laboratory accreditation bodies*

### 3 Terms and definitions

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

#### 3.1 Terms related to measurement methods

##### 3.1.1

##### **validation**

confirmation by examination and the provision of objective evidence that the particular requirements for the specific intended use are fulfilled

[ISO/IEC 17025:2005]

##### 3.1.2

##### **accuracy**

closeness of agreement between a test result or measurement result and the true value

NOTE 1 In practice, the accepted reference value (3.2.6) is substituted for the true value.

NOTE 2 The term “accuracy”, when applied to a set of test or measurement results, involves a combination of random components and a common systematic error or bias component.

NOTE 3 Accuracy refers to a combination of trueness and precision.

[ISO 3534-2:2006]

##### 3.1.3

##### **bias**

difference between the expectation of a test result or measurement result and a true value

[ISO 3534-2:2006]

##### 3.1.4

##### **trueness**

closeness of agreement between the expectation of a test result or a measurement result and a true value

NOTE 1 The measure of trueness is usually expressed in terms of bias.

NOTE 2 Trueness is sometimes referred to as “accuracy of the mean”. This usage is not recommended.

NOTE 3 In practice, the accepted reference value is substituted for the true value.

[ISO 3534-2:2006]

##### 3.1.5

##### **precision**

closeness of agreement between independent test/measurement results obtained under stipulated conditions

NOTE 1 Precision depends only on the distribution of random errors and does not relate to the true value or the specified value.

NOTE 2 The measure of precision is usually expressed in terms of imprecision and computed as a standard deviation of the test results or measurement results. Less precision is reflected by a larger standard deviation.