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Water quality — Determination of the chemical oxygen demand index (ST-COD) — Small-scale sealed-tube method

Qualité de l'eau — Détermination de l'indice de demande chimique en oxygène (ST-DCO) — Méthode à petite échelle en tube fermé

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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15705 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*.

Annexes A to G of this International Standard are for information only.

Introduction

The chemical oxygen demand, ST-COD value, of water as determined by this dichromate method can be considered as an estimate of the theoretical oxygen demand, i.e. the amount of oxygen consumed in total chemical oxidation of the organic constituents present in the water. The degree to which the test results approach the theoretical value depends primarily on how complete the oxidation is. The ST-COD test is an empirical test and the effects of any oxidizing or reducing agents are included in the result. Under the conditions of the test, many organic compounds and most inorganic reducing agents are oxidized to between 90 % and 100 %. For waters that contain these compounds, such as sewage, industrial waste and other polluted waters, the ST-COD value is a realistic measure of the theoretical oxygen demand. However, for waters that contain large quantities of other substances that are difficult to oxidize under the conditions of the test, such as nitrogenous and heterocyclic compounds (e.g. pyridine and aliphatic and aromatic hydrocarbons), the ST-COD value is a poor measure of the theoretical oxygen demand. This may be the case for some industrial effluents.

The significance of an ST-COD value thus depends on the composition of the water studied. This should be borne in mind when judging results obtained by the method specified in this International Standard.

Detailed testing has shown good comparison between this method and the method of ISO 6060. However, it should not be assumed that this method is comparable in all cases to that of ISO 6060 without testing, particularly when there is a problem in obtaining a 2 ml representative sample (e.g. samples with high content of suspended solids).

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WARNING — Persons using this standard should be familiar with normal laboratory practice. This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This International Standard specifies a method for the determination of the chemical oxygen demand (ST-COD) using the sealed tube method. The test is empirical and is applicable to any aqueous sample, which includes all sewage and waste waters.

The method is applicable to undiluted samples having ST-COD values up to 1 000 mg/l and a chloride concentration not exceeding 1 000 mg/l. Samples with higher ST-COD values require predilution. For samples with a low COD, the precision of the measurement will be reduced and the detection limit will be poorer.

Samples with a high chloride concentration will need to be prediluted to give a chloride concentration of approximately 1 000 mg/l or less before analysis.

The method oxidizes almost all types of organic compounds and most inorganic reducing agents. It has a detection limit (4,65 times the within-batch standard deviation of a blank or very low standard) of 6 mg/l for photometric detection at 600 nm, and 15 mg/l for titrimetric detection as reported by one laboratory comparing the photometric and titrimetric techniques using a commercial test kit with a range up to 1 000 mg/l.

The titrimetric part of this International Standard is applicable to samples exhibiting an atypical colour or turbidity after the digestion stage.

NOTE A comparison between the full-scale method (ISO 6060) and the method of this International Standard is given in annex A. A discussion of possible hazards is given in annex B. Information on commercial small-scale test kits is given in annex C. The method can be used over a reduced range (see annexes D and E). For checking the chloride concentration, see annex F.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*

ISO 5667-3:1994, *Water quality — Sampling — Part 3: Guidance on the preservation and handling of samples*