INTERNATIONAL STANDARD

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Water quality — Evaluation of the "ready", "ultimate" aerobic biodegradability of organic compounds in an aqueous medium — Method by analysis of dissolved organic carbon (DOC)

Qualité de l'eau — Évaluation de la biodégradabilité aérobie «facile», «ultime» des composés organiques en milieu aqueux — Méthode par analyse du carbone organique dissous (COD)

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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.

ISO 7827 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 5, *Biological methods*.

This third edition cancels and replaces the second edition (ISO 7827:1994), which has been technically revised.

Water quality — Evaluation of the “ready”, “ultimate” aerobic biodegradability of organic compounds in an aqueous medium — Method by analysis of dissolved organic carbon (DOC)

WARNING — Persons using this International 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.

IMPORTANT — It is absolutely essential that tests conducted according to this International Standard be carried out by suitably trained staff.

SAFETY PRECAUTIONS — Activated sludge and sewage contain potentially pathogenic organisms. Therefore take appropriate precautions when handling them. Handle toxic test compounds and those whose properties are unknown with care.

1 Scope

This International Standard specifies a method for the evaluation of the “ready” and “ultimate” biodegradability of organic compounds at a given range of concentrations by aerobic microorganisms. In this context, this International Standard also gives specific definitions for the terms “ready” and “ultimate”.

The method applies to organic compounds which are:

a) soluble at the concentration used under the conditions of the test [dissolved organic carbon (DOC) concentrations of 10 mg/l to 40 mg/l];

b) non-volatile or having a negligible vapour pressure under the conditions of the test;

c) not significantly adsorbable on glass and activated sludge;

d) not inhibitory to the test microorganisms at the concentration chosen for the test.

The method is not suitable for waste waters, as they usually contain significant amounts of water-insoluble organic carbon, which is not included in DOC measurements.

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 8245, *Water quality — Guidelines for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC)*

ISO 9408, *Water quality — Evaluation of ultimate aerobic biodegradability of organic compounds in aqueous medium by determination of oxygen demand in a closed respirometer*

ISO 9439, *Water quality — Evaluation of ultimate aerobic biodegradability of organic compounds in aqueous medium — Carbon dioxide evolution test*

3 Terms and definitions

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

3.1
degradation time
t_2
time from the end of the lag time, t_1, until the time that about 90 % of the maximum level of biodegradation has been reached

NOTE Degradation time is expressed in days.

3.2
inherent biodegradation
level of biodegradation achieved which indicates the test compound is unlikely to be persistent in the environment

NOTE See Annex B.

3.3
lag time
t_1
time from the start of the test until 10 % biodegradation has been reached

NOTE Lag time is expressed in days.

3.4
maximum level of biodegradation
degree of biodegradation of a chemical compound or organic matter in a test above which no further biodegradation takes place during the test

3.5
primary biodegradation
structural change (transformation) of a chemical compound by microorganisms resulting in the loss of a specific property of that compound

3.6
"ready" biodegradation
level of biodegradation achieved under defined conditions which indicates the test compound is considered likely to degrade rapidly and completely under aerobic aquatic environmental conditions

NOTE See Annex B.

3.7
suspended solids
⟨activated sludge⟩ solid material within activated sludge with a particle diameter of >45 µm

NOTE The concentration of suspended solids is obtained by filtration or centrifugation of a known volume of sludge under specified conditions, drying at 105 °C, and correcting for the volume of sample. The concentration of suspended solids is expressed in milligrams per litre.

3.8
"ultimate" biodegradation
breakdown of a chemical compound or organic matter by microorganisms to carbon dioxide, water and mineral salts of any other elements present (mineralization), and the production of new biomass

