



International
Standard

ISO 20236

**Water quality — Determination
of total organic carbon (TOC),
dissolved organic carbon (DOC),
total bound nitrogen (TNb) and
dissolved bound nitrogen (DNb)
after high temperature catalytic
oxidative combustion**

*Qualité de l'eau — Dosage du carbone organique total (COT),
carbone organique dissous (COD), azote lié total (TNb) et azote
lié dissous (DNb) après combustion catalytique oxydante à haute
température*

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 230, *Water analysis*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 20236:2018), which has been technically revised.

The main changes are as follows:

- the method to determine concentrations <1 mg/l of C and N has been expanded;
- the normative references have been updated;
- the method to apply single component standard calibration solutions e.g. based on as ammonium sulfate or potassium nitrate, has been expanded;
- [Clause A.5](#) has been added in order to require referencing the difference methods with the results report.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Total organic carbon (TOC), dissolved organic carbon (DOC), total bound nitrogen (TNb) and dissolved bound nitrogen (DNb) are an analytical convention, whose characteristic is a parameter used for water quality control purposes. These parameters represent the sum of organically bound carbon as well as the sum of inorganic and organic nitrogen (but not nitrogen gas), which can be dissolved in water or bonded to dissolved or suspended matter under specified conditions and, if the sample is not filtered, includes that associated with suspended matter. It does not give information on the nature of the substances. The abbreviations TOC, DOC, TNb, DNb, TC and TIC refer to values determined by the high temperature method.

Details of a validation interlaboratory trial with the performance data for TOC or DOC and TNb or DNb, all using the high temperature method in this document, are given in [Annex B](#).

Water quality — Determination of total organic carbon (TOC), dissolved organic carbon (DOC), total bound nitrogen (TNb) and dissolved bound nitrogen (DNb) after high temperature catalytic oxidative combustion

WARNING — Persons using this document should be familiar with normal laboratory practice. This document 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.

IMPORTANT — It is absolutely essential that tests conducted in accordance with this document be carried out by suitably qualified staff.

1 Scope

This document specifies a method to determine the total organic carbon (TOC), dissolved organic carbon (DOC), total bound nitrogen (TNb) and dissolved bound nitrogen (DNb) in the form of free ammonia, ammonium, nitrite, nitrate and organic compounds capable of conversion to nitrogen oxides.

Cyanide, cyanate and particles of elemental carbon (soot), when present in the sample, can be determined together with the organic carbon.

Dissolved nitrogen gas (N₂) is not determined.

NOTE Generally, the method can be applied for the determination of total carbon (TC) and total inorganic carbon (TIC) – see [Annex A](#).

The method is applicable to water samples (e.g. drinking water, raw water, ground water, surface water, sea water, waste water, leachates).

This document is applicable to determination of TOC and DOC ≥ 1 mg/l and TNb and DNb ≥ 1 mg/l. The upper working range is restricted by instrument-dependent conditions (e.g. injection volume). Higher concentrations can be determined after appropriate dilution of the sample. The determination of concentrations < 1 mg/l is dependent on instrument conditions applying appropriate calibration.

For samples containing volatile organic compounds (e.g. industrial waste water), the application of the difference method can be considered – see [Annex A](#).

The procedure is carried out by automated analysis.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 8466-1, *Water quality — Calibration and evaluation of analytical methods — Part 1: Linear calibration function*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 **total carbon**

TC
sum of measured organically and inorganically bound carbon present in water, including elemental carbon

Note 1 to entry: The total carbon is defined as measured under the conditions of the method described in this document.

3.2 **total inorganic carbon**

TIC
sum of measured inorganic carbon present in water

Note 1 to entry: The total inorganic carbon is defined as measured under the conditions of the method described in this document.

Note 2 to entry: The total inorganic carbon is measured as CO₂ originating only from carbonates, hydrogen carbonates and dissolved carbon dioxide.

3.3 **total organic carbon**

TOC
sum of measured organically bound carbon present in water, bonded to dissolved or suspended matter, including cyanate, thiocyanate and elemental carbon

Note 1 to entry: The total organic carbon is defined as measured under the conditions of the method described in this document.

Note 2 to entry: Volatile organic carbon cannot be guaranteed to be determined by the method.

Note 3 to entry: Generally, total organic carbon includes organic compounds in water that cannot be purged under the conditions of this method, also known as non-purgeable organic carbon (NPOC).

3.4 **dissolved organic carbon**

DOC
sum of measured organically bound carbon present in water originating from compounds passing through a membrane filter of 0,45 µm pore size, including cyanate and thiocyanate

Note 1 to entry: The dissolved organic carbon is defined as measured under the conditions of the method described in this document.

3.5 **total bound nitrogen**

TNb
sum of measured organically bound and inorganically bound nitrogen present in water or suspended matter

Note 1 to entry: The total bound nitrogen is defined as measured under the conditions of the method described in this document.