

Water quality - Determination of carbon 14 activity -
Liquid scintillation counting method (ISO 13162:2011)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 13162:2015 sisaldab Euroopa standardi EN ISO 13162:2015 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 13162:2015 consists of the English text of the European standard EN ISO 13162:2015.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 05.08.2015.	Date of Availability of the European standard is 05.08.2015.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

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English Version

Water quality - Determination of carbon 14 activity - Liquid
scintillation counting method (ISO 13162:2011)

Qualité de l'eau - Détermination de l'activité volumique du
carbone 14 - Méthode par comptage des scintillations en
milieu liquide (ISO 13162:2011)

Wasserbeschaffenheit - Bestimmung der Aktivität von
Kohlenstoff-14 - Verfahren mit dem
Flüssigszintillationszähler (ISO 13162:2011)

This European Standard was approved by CEN on 30 July 2015.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of ISO 13162:2011 has been prepared by Technical Committee ISO/TC 147 "Water quality" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 13162:2015 by Technical Committee CEN/TC 230 "Water analysis" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2016, and conflicting national standards shall be withdrawn at the latest by February 2016.

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Endorsement notice

The text of ISO 13162:2011 has been approved by CEN as EN ISO 13162:2015 without any modification.

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Introduction

The carbon 14 (^{14}C) present in the environment is of natural origin and man made. As a result of atmospheric nuclear weapon testing, emissions from nuclear engineering installations, and the application and processing of isotopes, relatively large amounts of ^{14}C have been released into the environment. Due to the substantial proportion of ^{14}C in the human internal dose contribution, monitoring of ^{14}C activity concentrations in the environment is necessary in order to follow its circulation in the hydrosphere and biosphere. ^{14}C is the second radionuclide (~3 500 Bq) to contribute to the human body natural radioactivity, behind ^{40}K (~6 000 Bq).

Water quality — Determination of carbon 14 activity — Liquid scintillation counting method

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.

1 Scope

This International Standard specifies the conditions for the determination of ^{14}C activity concentration in samples of environmental water or of ^{14}C -containing water using liquid scintillation counting.

The method is applicable to the analysis of any organic molecule soluble in water that is well mixed with the scintillation cocktail. It does not apply to micelles or “large” particles (lipids, fulvic acid, humic acid, etc.) that are inadequately mixed with the scintillation cocktail and the water. Some beta energy is lost without any excitation of the scintillation cocktail and the results are underestimated. The method is not applicable to the analysis of organically bound ^{14}C , whose determination requires additional chemical processing (such as chemical oxidation, combustion).

It is possible to determine ^{14}C activity concentrations below 10^6 Bq l^{-1} without any sample dilution.

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 5667-1, *Water quality — Sampling — Part 1: Guidance on the design of sampling programmes and sampling techniques*

ISO 5667-3, *Water quality — Sampling — Part 3: Preservation and handling of water samples*

ISO 11929, *Determination of the characteristic limits (decision threshold, detection limit and limits of the confidence interval) for measurements of ionizing radiation — Fundamentals and application*

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

ISO 80000-10, *Quantities and units — Part 10: Atomic and nuclear physics*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*