



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 10704:2026**  
**01-julij-2026**

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**Kakovost vode - Skupna alfa in skupna beta aktivnost - Preskusna metoda z odlaganjem v tankem sloju (ISO/DIS 10704:2026)**

Water quality - Gross alpha and gross beta activity - Test method using thin source deposit (ISO/DIS 10704:2026)

Wasserbeschaffenheit - Gesamt-Alpha- und Gesamt-Beta-Aktivität - Dünnschichtverfahren (ISO/DIS 10704:2026)

Qualité de l'eau - Activités alpha globale et bêta globale - Méthode d'essai par dépôt d'une source fine (ISO/DIS 10704:2026)

Ta slovenski standard je istoveten z: **prEN ISO 10704**

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**ICS:**

13.060.60	Preiskava fizikalnih lastnosti vode	Examination of physical properties of water
13.280	Varstvo pred sevanjem	Radiation protection

**oSIST prEN ISO 10704:2026**

**en,fr,de**

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# DRAFT International Standard

## ISO/DIS 10704.2

### Water quality — Gross alpha and gross beta activity — Test method using thin source deposit

*Qualité de l'eau — Activités alpha globale et bêta globale —  
Méthode d'essai par dépôt d'une source fine*

ICS: 13.060.60; 13.280

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## ISO/DIS 10704.2:2026(en)

## Contents

	Page
<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>2</b>
<b>4 Symbols</b> .....	<b>2</b>
<b>5 Principle</b> .....	<b>3</b>
<b>6 Chemical reagents and equipment</b> .....	<b>3</b>
6.1 Reagents.....	3
6.1.1 General.....	3
6.1.2 Standard solutions.....	3
6.1.3 Wetting or surfactant agents.....	4
6.1.4 Volatile organic solvents.....	4
6.1.6 Specific reagents for alpha-emitting radionuclides co-precipitation.....	4
6.2 Equipment.....	4
6.2.1 Laboratory equipment for direct evaporation.....	4
6.2.2 General equipment.....	4
6.2.3 Special equipment for alpha-emitting radionuclide co-precipitation.....	5
6.2.4 Measurement equipment.....	5
<b>7 Sampling</b> .....	<b>5</b>
<b>8 Procedure</b> .....	<b>5</b>
8.1 Preliminary.....	5
8.2.1 Preparation of planchet.....	5
8.2.2 Evaporation.....	6
8.2.3 Co-precipitation.....	6
8.3 Counting stage.....	7
8.4 Background and blank determination.....	7
8.5 Preparation of counting standard for calibration.....	8
8.6 Preparation of calibration source for self-absorption determination.....	8
8.6.1 General.....	8
8.6.2 Spiking one of two test portions.....	8
8.6.3 Self-absorption curve.....	8
<b>9 Expression of results</b> .....	<b>9</b>
9.1 General.....	9
9.2 Alpha activity concentration.....	9
9.3 Beta activity concentration.....	9
9.4 Standard uncertainty of the alpha activity concentration.....	10
9.5 Standard uncertainty of the beta activity concentration.....	11
9.6 Decision threshold.....	12
9.6.1 Decision threshold of the alpha activity concentration.....	12
9.6.2 Decision threshold of the beta activity concentration.....	12
9.7 Limit of detection.....	12
9.7.1 Limit of detection of the alpha activity concentration.....	12
9.7.2 Limit of detection of the beta activity concentration.....	12
9.8 Limits of the coverage intervals.....	13
9.8.1 Limits of the probabilistically symmetric coverage interval.....	13
9.8.2 The shortest coverage interval.....	13
<b>10 Control of interferences</b> .....	<b>14</b>
10.1 General.....	14
10.2 Relative humidity.....	14
10.3 Geometry of the deposit.....	16

**ISO/DIS 10704.2:2026(en)**

10.4	Crosstalk.....	16
10.5	Gamma emitters.....	16
10.6	Low beta energy.....	16
10.7	Chlorides.....	16
10.8	Organic matter.....	17
10.9	Contamination.....	17
10.10	Losses of activity.....	17
10.11	Contribution of the natural radionuclides.....	17
10.12	Losses of activity.....	18
<b>11</b>	<b>Test report.....</b>	<b>18</b>
	<b>Annex A (informative) Numerical applications.....</b>	<b>20</b>
	<b>Bibliography.....</b>	<b>22</b>

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## ISO/DIS 10704.2:2026(en)

### Foreword

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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 document 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](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 3, *Radioactivity measurements*, 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 third edition cancels and replaces the second edition (ISO 10704:2019), which has been technically revised.

The main changes are as follows:

- additional information on the measurement strategy has been added;
- the maximum evaporation temperature increase from 85 to 90°C
- the requirement for storing the planchet before measurement in a desiccator has been revised to a recommendation as other storage methods can be used;
- [Formula \(19\)](#) and [Formula \(21\)](#) have been corrected;
- coverage intervals in accordance with ISO 11929-1 [\[1\]](#) have been added;
- a curve showing the kinetic of rehydration of the planchet and the impact on the overall alpha count rate have been added;
- [Clause 11](#) has been revised;
- Annex A "numerical application" has been updated and corrected.

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](http://www.iso.org/members.html).

## ISO/DIS 10704.2:2026(en)

### Introduction

Radionuclides are present throughout the environment; thus, water bodies (e.g. surface waters, ground waters, sea waters) contain radionuclides, which can be of either natural or anthropogenic origin.

- Naturally occurring radionuclides, including  $^3\text{H}$ ,  $^{14}\text{C}$ ,  $^{40}\text{K}$  and those originating from the thorium and uranium decay series, in particular  $^{210}\text{Pb}$ ,  $^{210}\text{Po}$ ,  $^{222}\text{Rn}$ ,  $^{226}\text{Ra}$ ,  $^{228}\text{Ra}$ ,  $^{227}\text{Ac}$ ,  $^{232}\text{Th}$ ,  $^{231}\text{Pa}$ ,  $^{234}\text{U}$  and  $^{238}\text{U}$ , can be found in water bodies due to either natural processes (e.g. desorption from the soil, runoff by rain water) or released from technological processes involving naturally occurring radioactive materials (e.g. mining, mineral processing, oil, gas and coal production, water treatment and the production and use of phosphate fertilisers).
- Anthropogenic radionuclides such as  $^{55}\text{Fe}$ ,  $^{59}\text{Ni}$ ,  $^{63}\text{Ni}$ ,  $^{90}\text{Sr}$ ,  $^{99}\text{Tc}$ , transuranic elements (Np, Pu, Am and Cm) and gamma emitting radionuclides such as  $^{60}\text{Co}$  and  $^{137}\text{Cs}$  can also be found in natural waters. Small quantities of anthropogenic radionuclides can be discharged from nuclear facilities to the environment as a result of authorized routine releases. The radionuclides present in liquid effluents are usually controlled before being discharged to the environment<sup>[2]</sup> and water bodies. Anthropogenic radionuclides used in medical and industrial applications can be released to the environment after use. Anthropogenic radionuclides are also found in waters due to the contamination from fallout resulting above-ground nuclear detonations and accidents such as those that occurred at the Chornobyl and Fukushima nuclear facilities.

Radionuclide activity concentrations in water bodies can vary according to local geological characteristics and climatic conditions and can be locally and temporally enhanced by releases from nuclear facilities during planned, existing and emergency exposure situations<sup>[3][4]</sup>. Some drinking water sources can thus contain radionuclides at activity concentrations that can present a human health risk. The World Health Organization (WHO) recommends to routinely monitor radioactivity in drinking waters<sup>[5]</sup> and to take proper actions when needed to minimize the health risk.

National regulations usually specify the activity concentration limits that are authorized in drinking waters, water bodies and liquid effluents to be discharged to the environment. These limits can vary for planned, existing and emergency exposure situations. As an example, during either a planned or existing situation, the WHO guidance level in drinking water is  $0,5 \text{ Bq}\cdot\text{l}^{-1}$  for gross alpha activity and  $1 \text{ Bq}\cdot\text{l}^{-1}$  for gross beta activity<sup>[5]</sup> – see NOTES 1 and 2. Conformity with these limits is assessed by measuring radioactivity in water samples and by comparing the results obtained with their associated uncertainties as specified by ISO/IEC Guide 98-3<sup>[6]</sup> and ISO 5667-20<sup>[7]</sup>.

NOTE 1 If the value is not specified in Annex 6 of Reference <sup>[5]</sup>, the value has been calculated using the formula provided in Reference <sup>[5]</sup> and the dose coefficient data from References <sup>[8]</sup> and <sup>[9]</sup>.

NOTE 2 The guidance level calculated in Reference <sup>[5]</sup> is the activity concentration with an intake of  $2 \text{ l}\cdot\text{d}^{-1}$  of drinking water for one year, results in an effective dose of  $0,1 \text{ mSv}\cdot\text{a}^{-1}$  to members of the public. This is an effective dose that represents a very low level of risk to human health and which is not expected to give rise to any detectable adverse health effects<sup>[5]</sup>.

This document contains method to support laboratories which need to determine gross alpha activity and gross beta activity in water samples.

The method described in this document can be used for various types of waters ([Clause 1](#)). Minor modifications such as sample volume and counting time can be made if needed to ensure that the characteristic limits (decision threshold, limit of detection and uncertainties) are below the required limits. This can be done for several reasons such as emergency situations, lower national guidance limits and operational requirements.

# Water quality — Gross alpha and gross beta activity — Test method using thin source deposit

## 1 Scope

**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.

This document specifies a method for the determination of gross alpha and gross beta activity concentrations for alpha- and beta-emitting radionuclides. Gross alpha and gross beta activity measurement is not intended to give an absolute determination of the activity concentration of all alpha and beta emitting radionuclides in a test sample, but is a screening analysis to ensure particular reference levels of specific alpha and beta emitters have not been exceeded. This type of determination is also known as gross alpha and gross beta index. Gross alpha and gross beta analysis is not expected to be as accurate nor as precise as specific radionuclide analysis after radiochemical separations.

Maximum beta energies of approximately 0,1 MeV or higher are well measured. It is possible that low energy beta emitters cannot be detected (e.g.  $^3\text{H}$ ,  $^{55}\text{Fe}$ ,  $^{241}\text{Pu}$ ) or can only be partially detected (e.g.  $^{14}\text{C}$ ,  $^{35}\text{S}$ ,  $^{63}\text{Ni}$ ,  $^{210}\text{Pb}$ ,  $^{228}\text{Ra}$ ). If the presence of low-energy beta emitters is strongly suspected, liquid scintillation analysis is recommended (ISO 11704).

The method described in this document applies to non-volatile radionuclides, since some gaseous or volatile radionuclides (e.g. radon and radioiodine) can be lost during the source preparation.

The method described in this document is applicable to test samples of drinking water, rainwater, sea water, surface and ground water as well as cooling water, industrial water, domestic and industrial wastewater after proper sampling, sample handling and test sample preparation (filtration when necessary and taking into account the amount of dissolved material in the water).

The method described in this document can be used in the event of an emergency situation, because the results can be obtained in less than 1 h. Detection limits reached for gross alpha and gross beta are less than  $10 \text{ Bq}\cdot\text{l}^{-1}$  and  $20 \text{ Bq}\cdot\text{l}^{-1}$ , respectively, for instance for rainwater water. The evaporation of a 10 ml sample can be carried out in 20 min followed by 10 min counting using a gas-flow -proportional counter with window. It is the laboratory's responsibility to ensure the suitability of this test method for the water samples tested.

## 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 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 11929-1, *Determination of the characteristic limits (decision threshold, detection limit and limits of the coverage interval) for measurements of ionizing radiation — Fundamentals and application — Part 1: Elementary applications*