

DIN EN ISO 10703:2022-11 (E)

Water quality - Gamma-ray emitting radionuclides - Test method using high resolution gamma-ray spectrometry (ISO 10703:2021)

Contents		Page
European foreword		4
Foreword		5
Introduction		6
1 Scope		8
2 Normative references		8
3 Terms and definitions		9
4 Symbols		10
5 Principle		11
6 Reference sources		11
6.1 Source(s) for energy calibration.....		11
6.2 Reference source(s) for efficiency calibration.....		12
6.2.1 General.....		12
6.2.2 Reference sources for laboratory systems.....		12
6.2.3 Reference sources used with numerical methods.....		12
7 Reagents		12
8 Gamma-ray spectrometry equipment		13
8.1 General description.....		13
8.2 Detector types.....		13
8.3 High voltage power supply.....		14
8.4 Preamplifier.....		14
8.5 Cryostat or electric cooler.....		14
8.6 Shielding.....		14
8.7 Analogue or digital acquisition electronics.....		14
8.7.1 General.....		14
8.7.2 Analogue electronic (ADC).....		15
8.7.3 Digital electronic (DSP).....		15
8.8 Computer, including peripheral devices and software.....		15
9 Nuclear decay data		16
10 Sampling		16
11 Procedure		16
11.1 Sample preparation.....		16
11.1.1 General.....		16
11.1.2 Direct measurement without preparation.....		17
11.1.3 Evaporation without iodine retention.....		17
11.1.4 Evaporation with iodine retention.....		17
11.2 Calibration.....		17
11.2.1 General.....		17
11.2.2 Energy calibration.....		17
11.2.3 Efficiency calibration.....		18
12 Expression of results		19
12.1 Calculation of the activity concentration.....		19
12.1.1 General.....		19
12.1.2 Dead time and pile up corrections (see ISO 20042).....		20
12.1.3 Decay corrections.....		20
12.1.4 True coincidence summing.....		20

12.2	Standard uncertainty.....	22
12.3	Decision threshold.....	22
12.4	Detection limit.....	23
12.5	Limits of the coverage intervals.....	23
12.5.1	Limits of the probabilistically symmetric coverage interval.....	23
12.5.2	The shortest coverage interval.....	24
12.6	Corrections for contributions from other radionuclides and background.....	24
12.6.1	General.....	24
12.6.2	Contribution from other radionuclides.....	25
12.6.3	Contribution from background.....	26
13	Test report.....	26
Annex A	(informative) Example of a carrier solution which can be added to the water sample when waste water from a nuclear power plant is investigated.....	28
Annex B	(informative) True coincidence summing.....	29
Annex C	(informative) Calculation of the activity concentration from a gamma spectrum using a linear background subtraction (undisturbed peak).....	31
Bibliography	33