

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