

DIN EN ISO 13160:2024-11 (E)

Water quality - Strontium 90 and strontium 89 - Test methods using liquid scintillation counting or proportional counting (ISO 13160:2021)

Contents		Page
European foreword		4
Foreword		5
Introduction		6
1	Scope	8
2	Normative references	8
3	Terms and definitions	9
4	Principle	9
4.1	General	9
4.2	Chemical separation	10
4.3	Detection	10
5	Chemical reagents and equipment	10
6	Procedure	11
6.1	Test sample preparation	11
6.2	Chemical separation	11
6.2.1	General	11
6.2.2	Precipitation techniques	12
6.2.3	Liquid-liquid extraction technique	13
6.2.4	Chromatographic technique	13
6.3	Preparation of the source for test	13
6.3.1	Source preparation for liquid scintillation counter	13
6.3.2	Source preparation for proportional counter	13
6.4	Measurement	14
6.4.1	General	14
6.4.2	Liquid scintillation counter	14
6.4.3	Proportional counter	14
6.4.4	Efficiency calculation	15
6.4.5	Determination of the chemical yield	15
7	Expression of results	16
7.1	Determination of ⁹⁰ Sr in equilibrium with ⁹⁰ Y	16
7.1.1	Calculation of the activity concentration	16
7.1.2	Standard uncertainty	16
7.1.3	Decision threshold	17
7.1.4	Detection limit	17
7.2	Determination of ⁹⁰ Sr from separated ⁹⁰ Y	17
7.2.1	Calculation of the activity concentration	17
7.2.2	Standard uncertainty	18
7.2.3	Decision threshold	19
7.2.4	Detection limit	19
7.3	Determination of ⁹⁰ Sr and ⁸⁹ Sr utilizing ⁹⁰ Sr/ ⁹⁰ Y equilibrium	19
7.3.1	Calculation of the activity concentration	19
7.3.2	Standard uncertainty	20
7.3.3	Decision threshold	21
7.3.4	Detection limit	22
8	Limits of the coverage intervals	22
8.1	Limits of the of the probabilistically symmetric coverage interval	22
8.2	Limits of the shortest coverage interval	23

9	Quality control	23
10	Test report	23
	Annex A (informative) Determination of ⁸⁹Sr and ⁹⁰Sr by precipitation and proportional counting	25
	Annex B (informative) Determination of ⁸⁹Sr and ⁹⁰Sr by precipitation and liquid scintillation counting	29
	Annex C (informative) Determination of ⁹⁰Sr from its decay progeny ⁹⁰Y at equilibrium by organic extraction and liquid scintillation counting	33
	Annex D (informative) Determination of ⁹⁰Sr after ionic exchange separation by proportional counting	36
	Annex E (informative) Determination of ⁹⁰Sr after separation on a crown ether specific resin and liquid scintillation counting	39
	Annex F (informative) Determination of ⁹⁰Sr from its decay progeny ⁹⁰Y at equilibrium by organic extraction and proportional counting	41
	Annex G (informative) Correction factor for ⁹⁰Sr purity using proportional counting	45
	Bibliography	48