

ISO 18589-5:2019-12 (E)

Measurement of radioactivity in the environment - Soil - Part 5: Strontium 90 - Test method using proportional counting or liquid scintillation counting

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
3.1	Terms and definitions	2
3.2	Symbols	2
4	Principle	3
4.1	General	3
4.2	Chemical separation	3
4.3	Detection	4
4.3.1	General	4
4.3.2	Source preparation for liquid scintillation counter	4
4.3.3	Source preparation for proportional counter	4
4.3.4	Background determination	4
5	Chemical reagents and equipment	5
6	Procedure of strontium desorption	5
6.1	Principles	5
6.2	Technical resources	6
6.2.1	Equipment	6
6.2.2	Chemical reagents	6
6.3	Procedure	6
7	Chemical separation procedure by precipitation	7
7.1	Principles	7
7.2	Technical resources	7
7.2.1	Equipment	7
7.2.2	Chemical reagents	8
7.3	Procedure	8
7.3.1	Separation of alkaline metals and calcium	8
7.3.2	Separation of barium, radium and lead	9
7.3.3	Separation of fission products and yttrium	9
7.3.4	Strontium purification	9
7.3.5	Yttrium extraction	10
7.3.6	Determination of the chemical yields	11
8	Chemical separation procedure by liquid-liquid extraction	11
8.1	Principle	11
8.2	Technical resources	12
8.2.1	Equipment	12
8.2.2	Chemical reagents	12
8.3	Procedure	13
8.3.1	General	13
8.3.2	Chemical separation of yttrium	13

8.3.3	Source preparation to be measured by PC	14
8.3.4	Source preparation to be measured by LSC	14
8.3.5	Determination of the chemical yields	14
9	Chemical separation procedure by chromatography (crown ether resin)	15
9.1	Principles	15
9.2	Technical resources	15
9.2.1	Equipment	15
9.2.2	Chemical reagents	15
9.3	Procedure	16
9.3.1	General	16
9.3.2	Chemical separation of the strontium	16
9.3.3	Determination of chemical yield	17
10	Measurement	17
10.1	General	17
10.2	Liquid scintillation counter	17
10.3	Gas flow proportional counter	17
10.4	Calculation of counting efficiency	18
11	Expression of results	18
11.1	General	18
11.2	Determination of ^{90}Sr in equilibrium with ^{90}Y	18
11.2.1	Calculation of the activity per unit of mass	18
11.2.2	Standard uncertainty	19
11.2.3	Decision threshold	19
11.2.4	Detection limit	19
11.3	Determination of ^{90}Sr by the ^{90}Y	19
11.3.1	Calculation of the activity per unit of mass	19
11.3.2	Standard uncertainty	20
11.3.3	Decision threshold	20
11.3.4	Detection limit	21
11.4	Determination of ^{90}Sr in presence of ^{89}Sr when ^{90}Sr is in equilibrium with ^{90}Y	21
11.4.1	Calculation of the activity per unit of mass	21
11.4.2	Standard uncertainty	22
11.4.3	Decision threshold	22
11.4.4	Detection limit	23
11.5	Confidence limits	23
12	Test report	23
Annex A (informative) Examples of evaluation models		25
Bibliography		32