

საქართველოს სტანდარტი

სტაციონარული წყაროს ემისიები - გოგირდის ოქსიდების მასობრივი
კონცენტრაციის განსაზღვრა - სტანდარტული ეტალონური მეთოდი

საქართველოს სტანდარტებისა და მეტროლოგიის
ეროვნული სააგენტო
თბილისი

საინფორმაციო მონაცემები

1 დამტკიცებულია და შემოღებულია სამოქმედოდ საქართველოს სტანდარტებისა და მეტროლოგიის ეროვნული სააგენტოს 2018 წლის 11 მაისის № 54 და 2018 წლის 7 მარტის № 14 განკარგულებებით

2 მიღებულია თავფურცლის თარგმნის მეთოდით სტანდარტიზაციის ევროპული კომიტეტის სტანდარტი ენ 14791:2017 „სტაციონარული წყაროს ემისიები - გოგირდის ოქსიდების მასობრივი კონცენტრაციის განსაზღვრა - სტანდარტული ეტალონური მეთოდი”

3 პირველად

4 რეგისტრირებულია საქართველოს სტანდარტებისა და მეტროლოგიის ეროვნული სააგენტოს რეესტრში: 2018 წლის 11 მაისი №268-1.3-013285

აკრძალულია ამ სტანდარტის გადაცემა მესამე პირებისათვის ან/და მისი სხვა ფორმით გავრცელება

English Version

Stationary source emissions - Determination of mass
concentration of sulphur oxides - Standard reference
method

Emissions de sources fixes - Détermination de la
concentration massique des oxydes de soufre -
Méthode de référence normalisée

Emissionen aus stationären Quellen - Bestimmung der
Massenkonzentration von Schwefeloxiden -
Standardreferenzverfahren

This European Standard was approved by CEN on 26 September 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword.....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	7
4 Symbols and abbreviations	13
4.1 Symbols.....	13
4.2 Abbreviated terms	14
5 Principle	14
5.1 General.....	14
5.2 Measuring principle	14
6 Description of measuring system.....	15
6.1 Reagents	15
6.1.1 General.....	15
6.1.2 Hydrogen peroxide.....	15
6.1.3 Water	15
6.1.4 Absorption solution, H ₂ O ₂	15
6.1.5 Reagents for chromatographic analysis	15
6.1.6 Reagent for Thorin analysis	16
6.2 Sampling equipment	17
6.2.1 General.....	17
6.2.2 Sampling probe	17
6.2.3 Filter housing.....	17
6.2.4 Particle filter.....	18
6.2.5 Temperature controller.....	18
6.2.6 Absorbers.....	18
6.2.7 Sample gas pump.....	18
6.2.8 Gas volume meter	18
6.3 Analysis equipment.....	19
6.3.1 Ion chromatograph.....	19
6.3.2 Thorin method	19
7 Performance characteristics of the SRM.....	20
7.1 General.....	20
7.2 Performance characteristics of the sampling system	21
7.3 Performance characteristics of the analysis	21
7.3.1 Sources of uncertainty.....	21
7.3.2 Performance criterion of analysis	22
7.4 Establishment of the uncertainty budget.....	22
8 Field operation.....	23
8.1 Measurement planning	23
8.2 Sampling strategy.....	23
8.2.1 General.....	23
8.2.2 Measurement section and measurement plane.....	23

8.2.3	Minimum number and location of measurement points	24
8.2.4	Measurement ports and working platform.....	24
8.3	Assembling the equipment.....	24
8.4	Heating of the sample gas line	24
8.5	Leak test.....	24
8.6	Performing sampling.....	25
8.6.1	Introduction of the sampling probe in the duct	25
8.6.2	Sampling	25
8.6.3	Rinsing of the sampling system and preparation of the samples	25
8.7	Measurement series	26
8.8	Field blank.....	26
8.9	Absorption efficiency	26
8.9.1	General	26
8.9.2	Test of absorption efficiency	26
9	Analytical procedure	27
9.1	General	27
9.2	Ion Chromatography method.....	27
9.2.1	General procedure	27
9.2.2	Interferences.....	28
9.2.3	Calibration.....	28
9.3	Thorin Method	29
9.3.1	Pre-treatment of sample solution before analysis for Thorin method.....	29
9.3.2	General procedure	29
9.3.3	Preparation of a chemical blank solution.....	30
9.3.4	Interferents.....	30
10	Expression of results	31
11	Equivalence of Thorin and ion chromatography methods.....	33
11.1	General	33
11.2	Range.....	33
11.3	Matrix effect.....	33
11.4	Comparison of repeatability and trueness.....	33
12	Equivalence of an alternative method	34
13	Measurement report	34
Annex A (informative)	Validation of the method in the field.....	35
A.1	General	35
A.2	Round robin test of analytical methods	35
A.3	Field tests.....	36
A.3.1	General	36
A.3.2	Characteristics of installations	36
A.3.3	Limits of quantification	38
A.3.4	Repeatability and reproducibility.....	38
A.3.4.1	General	38
A.3.4.2	Repeatability	39
A.3.4.3	Reproducibility.....	41
A.3.5	Absorption efficiency	42

Annex B (informative) Examples of absorbers.....	43
Annex C (informative) Example of assessment of compliance of standard reference method for SO₂ with requirements on emission measurements	44
C.1 Introduction	44
C.2 Elements required for the uncertainty determinations	44
C.3 Example of an uncertainty calculation	44
C.3.1 Specific conditions in the field.....	44
C.3.2 Performance characteristics.....	46
C.3.3 Model equation and application of rule of uncertainty propagation.....	47
C.3.3.1 Concentration of SO₂	47
C.3.3.2 Calculation of the combined uncertainty of $V_{m,ref}$ and C_m	48
C.3.3.3 Calculation of sensitivity coefficients	48
C.3.3.4 Results of the standard uncertainties calculations.....	49
C.3.4 Estimation of the combined uncertainty	52
Annex D (informative) Type of sampling equipment.....	53
Annex E (informative) Example of comparison of repeatability and trueness of Thorin Method and Ion Chromatography Method.....	54
Annex F (informative) Calculation of the uncertainty associated with a concentration expressed on dry gas and at an oxygen reference concentration	64
F.1 Uncertainty associated with a concentration expressed on dry gas	64
F.2 Uncertainty associated with a concentration expressed at a oxygen reference concentration	66
Annex G (informative) Significant technical changes	68
Bibliography.....	69

European foreword

This document (EN 14791:2017) has been prepared by Technical Committee CEN/TC 264 "Air quality", the secretariat of which is held by DIN.

This document supersedes EN 14791:2005.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2017, and conflicting national standards shall be withdrawn at the latest by July 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

Annex G provides details of significant technical changes between this document and the previous edition.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.