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Ambient air quality - Standard method for measurement of benzene concentrations - Part 1: Pumped sampling followed by thermal desorption and gas chromatography

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Qualité de l'air ambiant - Méthode normalisée pour le mesurage de la concentration en benzène - Partie 1 : Prélèvement par pompage suivi d'une désorption thermique et d'une chromatographie en phase gazeuse

Außenluft - Verfahren zur Messung von Benzolkonzentrationen - Teil 1: Probenahme mit einer Pumpe, gefolgt von Thermodesorption und Gaschromatographie

This European Standard was approved by CEN on 20 November 2023.

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Contents

Page

European foreword ... 6
1 Scope ... 7
2 Normative references ... 7
3 Terms and definitions ... 7
4 Method description ... 11
4.1 Principle ... 11
4.2 Reagents and materials ... 11
4.3 Apparatus ... 13
4.4 Sampler conditioning and blank profiling ... 17
4.5 Setting of sampling flow rate ... 18
4.6 Sampling ... 18
5 Air inlet/manifold sampling equipment ... 19
5.1 General ... 19
5.2 Sampling location ... 19
5.3 Sample delivery ... 20
6 Type testing ... 21
6.1 General ... 21
6.2 Relevant performance characteristics and performance criteria ... 21
Table 1 — Requirements for sampling equipment ... 22
Table 2 — Requirements for analysis ... 24
6.3 Type testing programme ... 24
Table 3 — Calculation of measurement uncertainty ... 29
7 Field operations and ongoing quality control ... 31
7.1 General ... 31
7.2 Frequency of calibrations, checks and maintenance ... 31
Table 4 — Required frequency of calibration, checks and maintenance ... 31
7.3 Maintenance of the sampling device ... 32
7.4 Checks of sampling device sensors ... 32
7.5 Calibration of sampling device sensors ... 32
7.6 Checks of the sampling system flow rate ... 32
7.7 Calibration of the sampling device flow rate ... 33
7.8 Leak check of the sampling system ... 33
7.9 Evaluation of sample losses in the sampling device ... 33
8 Determination of measurement uncertainty ... 33
8.1 General ... 33
8.2 Parameters contributing to measurement uncertainty ... 34
Table 5 — Uncertainty parameters and minimum requirements ... 34
9 Report ... 35
10 Recommendations for use ... 35

Annex A (informative) Sorbent selection and characteristics 36
Table A.1 — Extrapolated retention volumes and safe sampling volumes for benzene at 20 °C 36
Table A.2 — Guidance on sorbent selection 36
Table A.3 — Guidance on sorbent use 37
Annex B (informative) Analysis of exposed samples 38
B.1 Safety precautions 38
B.2 Thermal desorption 38
B.3 Determination of desorption efficiency 39
B.4 Calibration 39
B.5 Determination of sample concentration 40
B.6 Calculation of mass concentration of benzene 40
Annex C (informative) Determination of breakthrough volume from gas standards 41
C.1 Reagents 41
C.2 Apparatus 41
C.3 Determination 41
C.4 Calculations 42
Figure C.1 — Schematic representation of set up for determination of breakthrough volume 42
Annex D (informative) Determination of breakthrough volumes from extrapolated retention volumes 43
D.1 Apparatus 43
D.2 Reagents 43
D.3 Determination 43
D.4 Expression of results 43
Annex E (informative) Assessment of performance indicators and uncertainty contributions 44
E.1 General 44
E.2 Sample volume 44
E.2.1 General 44
E.2.2 Sample flow calibration and measurement 45
E.2.3 Sampling time 46
E.2.4 Conversion of sampling volume to STP 46
E.2.4.1 Mass-flow controlled sampling devices 46
E.2.4.2 Volume-controlled sampling devices 47
E.3 Desorption efficiency and analytical repeatability 48
E.3.1 Introduction 48
E.3.2 Desorption efficiency 48

E.3.3 Analytical repeatability 48
E.4 Mass of benzene sampled 49
E.4.1 General 49
E.4.2 Sampling efficiency 49
E.4.3 Sample stability 49
E.4.4 Corrections to the measured mass of benzene 50
E.4.4.1 General 50
E.4.4.2 Calibration standards 50
E.4.4.3 Lack-of-fit of calibration function 50
E.4.4.4 Response drift between calibrations 51
E.4.4.5 Selectivity 51
Table E.1 — Test guidance on sorbent selectivity 52
E.4.5 Combined uncertainty in the measured mass of benzene 52
E.4.6 Combined uncertainty in the sampled mass of benzene 53
E.5 Mass of benzene in sample blank 53
E.6 Combined uncertainty in benzene concentration 53
E.7 Expanded uncertainty 54
E.8 Uncertainty from performance requirements 54
E.8.1 General 54
E.8.2 Analyte Ingress from air being sampled 54
Table E.2 — Uncertainties contribution to the reproducibility test for exclusion of AIFABS 55
Figure E.1 — Maximum deviation due to AIFABS 56
E.8.3 Analyte Ingress from Surrounding Air 56
E.8.4 Loss of Retained Analyte 56
Table E.3 — Uncertainties contribution to the reproducibility test for LORA evaluation 57
Figure E.2 — Maximum deviation due to LORA 58
Figure E.3 — Linear decay of analyte and maximum number of sampling days 59
E.9 Between-laboratory uncertainty 59
E.10 Example for uncertainty budget calculation 60
Table E.4 — Example uncertainty budget 60
Annex F (informative) Reproducibility, validation and comparison exercises 62
Annex G (informative) Performance characteristics 63
G.1 Prior art 63
Table G.1 — Uncertainty data from literature surveys 63
G.2 Results of inter-laboratory comparisons 64
Table G.2 — Results of inter-laboratory comparisons 65

Annex H (informative) Sampling equipment **66**
Annex I (informative) Significant technical changes **70**
Bibliography **71**

European foreword

This document (EN 14662-1:2023) has been prepared by Technical Committee CEN/TC 264 “Air quality”, the secretariat of which is held by DIN.

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 June 2024, and conflicting national standards shall be withdrawn at the latest by June 2024.

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

This document supersedes EN 14662-1:2005.

In comparison with the previous edition, the following technical modifications have been made:

— inclusion of the option of multi-tube sampling devices such that a series of samples can be collected sequentially and/or in parallel without user intervention in the field;

— specification of associated ‘type testing’ requirements to allow multi-tube sampling devices to be tested and approved;

— inclusion of gas standard calibration options, alongside liquid spiking, in line with best practice;

— extensive updates to technical aspects, including uncertainty calculations, in line with the latest standards.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

1 Scope

This document gives general guidance for the sampling and analysis of benzene in air by pumped sampling, thermal desorption and capillary gas chromatography.

This document is in accordance with the generic methodology selected as the basis of the European Union reference method for the determination of benzene in ambient air [1] for the purpose of comparison of measurement results with limit values with a one-year reference period.

This document is valid for the measurement of benzene in a concentration range of approximately 0,5 µg/m^3 to 50 µg/m^3. Air samples are typically collected over periods ranging from a few hours to 7 days.

The upper limit of the useful range is set by the sorptive capacity (the safe sampling volume) of the sorbent and by the linear dynamic range of the gas chromatograph column and detector or by the sample splitting capacity of the analytical instrumentation used. The lower limit of the useful range depends on the noise level of the detector and on blank levels of benzene and/or interfering artefacts on the sorbent. Artefacts are typically sub ng for graphitised carbon sorbents, but higher levels of aromatic hydrocarbons have been noted in other sorbents – e.g. porous polymers. The detection limit will be approximately 1/10 of the lower concentration range.

This document provides general guidance for the sampling of benzene using either a single sampling device, which is changed manually after every exposure period, or sequential sampling device capable of storing and exposing multiple samples without user intervention. The analysis methods are diverse, but a suitable approach for analysing samples and blanks and calculating benzene levels is described in Annex B.

NOTE The method described in this document can be used for the determination of other compounds besides benzene, under the condition of documented validation tests.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 16017-1, *Indoor, ambient and workplace air - Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography - Part 1: Pumped sampling (ISO 16017-1)*

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