

**Õhu kvaliteet. Benso(a)antratseeni,
benso(b)fluoranteeni, benso(j)fluoranteeni,
benso(k)fluoranteeni, benso(a)püreeni,
dibens(a,h)antratseeni ja indeno(1,2,3-cd)püreeni
sadestumise määramine**

Air quality - Determination of the deposition of
benz[a]anthracene, benzo[b]fluoranthene,
benzo[j]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene,
dibenz[a,h]anthracene and indeno[1,2,3-cd]pyrene

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 15980:2011 sisaldab Euroopa standardi EN 15980:2011 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 30.06.2011 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 25.05.2011.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 15980:2011 consists of the English text of the European standard EN 15980:2011.

This standard is ratified with the order of Estonian Centre for Standardisation dated 30.06.2011 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text 25.05.2011.

The standard is available from Estonian standardisation organisation.

ICS 13.040.01

Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

Right to reproduce and distribute belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:
Aru str 10 Tallinn 10317 Estonia; www.evs.ee; Phone: 605 5050; E-mail: info@evs.ee

English Version

Air quality - Determination of the deposition of
benzo[a]anthracene, benzo[b]fluoranthene, benzo[j]fluoranthene,
benzo[k]fluoranthene, benzo[a]pyrene, dibenz[a,h]anthracene
and indeno[1,2,3-cd]pyrene

Qualité de l'air - Détermination du benzo[a]anthracène,
benzo[b]fluoranthène, benzo[j]fluoranthène,
benzo[k]fluoranthène, benzo[a]pyrène,
dibenz[a,h]anthracène et indeno[1,2,3-cd]pyrène dans les
dépôts atmosphériques

Luftqualität - Bestimmung der Deposition von
Benz[a]anthracen, Benzo[b]fluoranthen,
Benzo[j]fluoranthen, Benzo[k]fluoranthen, Benzo[a]pyren,
Dibenz[a,h]anthracen und Indeno[1,2,3-cd]pyren

This European Standard was approved by CEN on 21 April 2011.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Symbols and abbreviations	7
4.1 Symbols	7
4.2 Abbreviations	8
5 Principle	9
6 Apparatus, reagents and materials	9
6.1 Reagents	9
6.2 Materials	9
6.3 Sampling equipment	9
6.4 Laboratory equipment	10
7 Sampling	10
7.1 General	10
7.2 Sampling location	10
7.3 Sampling requirements	11
7.4 Sample transport	12
8 Sample preparation and analysis	12
8.1 Sample storage	12
8.2 Extraction	12
8.3 Analysis	12
8.4 Interferences	12
9 Quality assurance	12
10 Calculation of results	13
11 Performance characteristics	13
12 Uncertainty	14
13 Reporting of results	14
Annex A (informative) Collectors used in the field trial	15
Annex B (normative) Work-up of deposition samples for PAH analysis	19
Annex C (normative) Analytical conditions	26
Annex D (informative) Performance characteristics determined in laboratory and field tests	29
Annex E (informative) Relationship between this European Standard and the essential requirements of EU Directives	43
Bibliography	44

Foreword

This document (EN 15980:2011) 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 November 2011, and conflicting national standards shall be withdrawn at the latest by November 2011.

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.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Directive 2004/107/EC [2] requires the measurement of the "total or bulk deposition" of benz[a]anthracene (BaA), benzo[b]fluoranthene (BbF), benzo[j]fluoranthene (BjF), benzo[k]fluoranthene (BkF), benzo[a]pyrene (BaP), dibenz[a,h]anthracene (DBahA) and indeno[1,2,3-*cd*]pyrene (INP) at background sites, one every 100 000 km². Wet-only sampling may be used instead of bulk sampling if it can be shown that the difference between their results is within 10 %. Where appropriate, monitoring shall be coordinated with the European Monitoring and Evaluation Programme (EMEP).

The Directive uses "total deposition" and "bulk deposition" as synonyms and defines it as the total mass of pollutants which is transferred from the atmosphere to surfaces (e.g. soil, vegetation, water, buildings) in a given area within a given time. The considered polycyclic aromatic hydrocarbons (PAH) are predominantly bound to particles. The mass of PAH bound to non sedimenting particles is thought to be low compared to the mass of the compounds bound to sedimenting wet and dry particles. Consequently the sum of the deposition of sedimenting wet and dry particles (defined as "bulk deposition" in this European Standard) and total deposition has been considered as substantially equivalent for the purposes of this document. At sites far enough from obstacles like buildings and trees the influence of specific surface characteristics on the deposition of PAH can be neglected.

This document describes the measurement of the deposition of PAH using collectors designed for bulk and wet-only deposition. The validation field test demonstrated that the funnel-bottle bulk collector provided the most reliable and robust results. Therefore this collector type has been chosen as standard collector.

1 Scope

This document specifies a method for the determination of the bulk deposition of benz[*a*]anthracene (BaA), benzo[*b*]fluoranthene (BbF), benzo[*j*]fluoranthene (BjF), benzo[*k*]fluoranthene (BkF), benzo[*a*]pyrene (BaP), dibenz[*a,h*]anthracene (DBahA) and indeno[1,2,3-*cd*]pyrene (INP), which can be used in the framework of Directive 2004/107/EC. This European Standard specifies performance requirements with which the method has to comply in order to meet the data quality objectives given in this Directive.

This document specifies methods for sampling, sample preparation and analysis using gas chromatography with mass spectroscopic detection (GC/MS) or high performance liquid chromatography with fluorescence detection (HPLC/FID). The funnel-bottle bulk collector is used as the standard collector.

The method is applicable for deposition measurements in

- rural and remote areas,
- industrial areas,
- urban areas.

The standard is applicable in the range from a few ng/(m²·d) to a few hundred ng/(m²·d).

2 Normative references

The following referenced documents are indispensable for the application 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 15549:2008, *Air quality — Standard method for the measurement of the concentration of benzo[*a*]pyrene in ambient air*

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1

analysis

all operations carried out after sample preparation to determine the amount or concentration of the polycyclic aromatic hydrocarbons of interest present in the sample

3.2

bulk collector

equipment to collect bulk deposition, permanently open to the atmosphere

NOTE In this document, two types of bulk collectors are described: a funnel-bottle bulk collector and a cylindrical gauge (Bergerhoff collector).

3.3

bulk deposition

sum of the deposition of sedimenting wet and dry particles

NOTE Bulk deposition does not contain gases and non-sedimenting particles. The bulk deposition of the polycyclic aromatic hydrocarbons is considered as substantially equivalent to total deposition.