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BSI Standards Publication

Ambient air — Method for the measurement of benz[a]anthracene, benzo[b]fluoranthene, benzo[j]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene and benzo[ghi]perylene

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Air ambiant - Méthode pour la mesure de benz[a]anthracène, benzo[b]fluoranthène, benzo[j]fluoranthène, benzo[k]fluoranthène, dibenz[a,h]anthracène, indeno[1,2,3-cd]pyrène et benzo[ghi]perylène

Außenluft - Verfahren zur Messung von Benz[a]anthracen, Benzo[b]fluoranthen, Benzo[j]fluoranthen, Benzo[k]fluoranthen, Dibenz[a,h]anthracen, Indeno[1,2,3-cd]pyren und Benzo[ghi]perylen

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Foreword

This document (CEN/TS 16645:2014) has been prepared by Technical Committee CEN/TC 264 “Air quality”, the secretariat of which is held by DIN.

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Introduction

The measurement methods specified in this document are based on methods that were worked out during the laboratory and field validation tests for the European Standards EN 15549 [5] (determination of BaP in ambient air) and EN 15980 [6] (determination of the deposition of several particle bound PAH compounds). Many data on the performance of the extraction and analysis of benz[*a*]anthracene (BaA), benzo[*b*]fluoranthene (BbF), benzo[*j*]fluoranthene (BjF), benzo[*k*]fluoranthene (BkF), dibenz[*a,h*]anthracene (DBahA), indeno[1,2,3-*cd*]pyrene (INP) and benzo[*ghi*]perylene (BghiP) in deposition or PM10 samples were gathered. These data do not cover the complete measurement procedure including sampling and consequently enable publication of a Technical Specification instead of a European Standard.

It is the long-term goal to combine this document with EN 15549 [5], once adequate progress has been made in the development of reliably working oxidant denuders.

1 Scope

This Technical Specification specifies a measurement method for the determination of the particle bound polycyclic aromatic hydrocarbon (PAH) compounds benz[*a*]anthracene (BaA), benzo[*b*]fluoranthene (BbF), benzo[*j*]fluoranthene (BjF), benzo[*k*]fluoranthene (BkF), dibenz[*a,h*]anthracene (DBahA), indeno[1,2,3-*cd*]pyrene (INP) and benzo[*ghi*]perylene (BghiP) in ambient air, which can be used in the framework of Council Directive 2008/50/EC [10] and Directive 2004/107/EC [11]. This document specifies performance characteristics and performance criteria for this measurement method. The performance characteristics of the measurement method are based on a sampling period of 24 h.

This Technical Specification describes a measurement method which comprises sampling of the selected PAH compounds as part of the PM10 particles, sample extraction and analysis by high performance liquid chromatography (HPLC) with fluorescence detector (FLD) or by gas chromatography with mass spectrometric detection (GC-MS). The method is applicable for the measurement of the PAH compounds in the concentration range from approx. 0,04 ng/m^3 to approximately 20 ng/m^3 for BaA, BbF, BjF, BkF, BaP, INP and BghiP and 0,02 ng/m^3 to approximately 2 ng/m^3 for DBahA. Table 1 shows examples for concentrations of the compounds (annual mean values) for sampling sites with different characteristics.

Table 1 — Examples of annual mean values of PAH compounds in PM10 at sampling sites with different characteristics (in ng/m^3)

Compound	Industrial [a]	Urban background [b]	Traffic [c]	Rural background [d]
BaA	0,85	0,24	0,24	0,06
BbF	2,44	0,62	0,48 [e]	0,16 [e]
BjF	0,89	0,27		
BkF	0,89	0,24	0,17	0,15
BaP	1,15	0,29	0,27	0,13
BghiP	1,31 [f]	0,29 [g]	0,34	0,09
DBahA	0,20	0,10	0,05 [f]	0,07 [h]
INP	1,60	0,43	0,23	0,08

[a] Bottrop (Germany, 2010), HPLC/FLD.
[b] Mülheim-Styrum (Germany, 2010), HPLC/FLD.
[c] London Crystal Palace Parade (UK, 2010), GC-MS.
[d] Harwell (UK, 2010), GC-MS.
[e] (Bbf+BjF).
[f] Wijk aan Zee (The Netherlands, 2011), GC-MS.
[g] Rotterdam (The Netherlands, 2011), GC-MS.
[h] (DBacA+DBahA).

The lower limit of the applicable range depends on the noise level of the detector and the variability of the laboratory filter blank.