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Standards

Irish Standard Recommendation  
S.R. CEN/TS 16645:2014

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

**S.R. CEN/TS 16645:2014**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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**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**

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]pérylène

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

This Technical Specification (CEN/TS) was approved by CEN on 16 December 2013 for provisional application.

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## CEN/TS 16645:2014 (E)

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## **CEN/TS 16645:2014 (E)**

### **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.

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 announce this Technical Specification: 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 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.

## CEN/TS 16645:2014 (E)

## 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 PM<sub>10</sub> 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<sup>3</sup> to approximately 20 ng/m<sup>3</sup> for BaA, BbF, BjF, BkF, BaP, INP and BghiP and 0,02 ng/m<sup>3</sup> to approximately 2 ng/m<sup>3</sup> 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 PM<sub>10</sub> at sampling sites with different characteristics (in ng/m<sup>3</sup>)**

Compound	Industrial <sup>a</sup>	Urban background <sup>b</sup>	Traffic <sup>c</sup>	Rural background <sup>d</sup>
BaA	0,85	0,24	0,24	0,06
BbF	2,44	0,62	0,48 <sup>e</sup>	0,16 <sup>e</sup>
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 <sup>f</sup>	0,20 <sup>g</sup>	0,34	0,09
DBahA	0,20	0,10	0,05 <sup>f</sup>	0,07 <sup>h</sup>
INP	1,60	0,43	0,23	0,08

<sup>a</sup> Bottrop (Germany, 2010), HPLC/FLD.

<sup>b</sup> Mülheim-Styrum (Germany, 2010), HPLC/FLD.

<sup>c</sup> London Crystal Palace Parade (UK, 2010), GC-MS.

<sup>d</sup> Harwell (UK, 2010), GC-MS.

<sup>e</sup> (BbF+BjF).

<sup>f</sup> Wijk aan Zee (The Netherlands, 2011), GC-MS.

<sup>g</sup> Rotterdam (The Netherlands, 2011), GC-MS.

<sup>h</sup> (DBaC+DBahA).

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



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