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NSAI Standards

Irish Standard
I.S. EN 16909:2017

Ambient air - Measurement of elemental carbon (EC) and organic carbon (OC) collected on filters

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National Foreword

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16909

March 2017

ICS 13.040.20

English Version

Ambient air - Measurement of elemental carbon (EC) and organic carbon (OC) collected on filters

Air ambiant - Mesurage du carbone élémentaire (EC) et du carbone organique (OC) prélevés sur filtre

Außenluft - Messung von auf Filtern abgeschiedenem elementarem Kohlenstoff (EC) und organisch gebundenem Kohlenstoff (OC)

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European foreword

This document (EN 16909:2017) 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of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

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Introduction

For air quality across the European Union to be assessed on a consistent basis, Member States need to employ standard measurement techniques and procedures. The aim of this European Standard is to present guidance on the measurement procedures to be followed when monitoring elemental carbon (EC) and organic carbon (OC) collected on filters, following Council Directive 2008/50/EC on ambient air quality and cleaner air for Europe [1]. This requires the chemical speciation of the sub-2,5 µm size fraction of suspended particulate matter ($PM_{2,5}$) in ambient air, as described in Annex IV.

The method set out in this European Standard provides operational definitions of the measured quantities. Currently no traceable primary reference materials are available for EC and OC analysis and no absolute scientific distinction between EC and OC is possible.

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1 Scope

This European Standard is applicable for the measurement of elemental carbon (EC) and organic carbon (OC) following the requirement for all EU member states to measure EC and OC in particulate matter from June 2010 at background sites according to the Council Directive 2008/50/EC on ambient air quality and cleaner air for Europe [1].

This European Standard describes the analytical procedures for determining EC and OC on quartz fibre filters as µg/cm², and the subsequent calculation of concentrations as µg/m³. Sampling onto filters is to be done in accordance with EN 12341:2014 for $PM_{2,5}$. The sampling process determines the size fraction of the particulate matter, the retention of semi-volatile material, and uptake/loss of volatile organic compounds on the filter at the time of sampling.

The same analysis method may also be used for smaller size fractions than $PM_{2,5}$. Any possible additional artefacts for larger particles, e.g. pyrolysis or higher concentrations of carbonates, should be assessed.

The scope includes rural background and urban background sites. The measurement method can also be applied to other site types, provided that the measurement range given below is not exceeded. The use of this standard at all site types allows the assessment of additional exposure of people in urban areas as stated in the objectives of the council directive and to achieve coherence in the European approach.

The applicable concentration range of the proposed method is limited by the optical correction and instrument applied in the analysis of EC and OC. This method was validated from 0,2 µg C_{EC}/cm² and 1,8 µg C_{OC}/cm² to 38 µg C_{EC}/cm² and 49 µg C_{OC}/cm² in the laboratory and to 16 µg C_{EC}/cm² and 45 µg C_{OC}/cm² in the laboratory validation exercise and in the field validation exercise.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12341:2014, *Ambient air - Standard gravimetric measurement method for the determination of the PM10 or PM2,5 mass concentration of suspended particulate matter*

3 Terms, definitions and abbreviations

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

3.1 Terms and definitions

3.1.1
total carbon
TC
total quantity of carbon in a PM sample, including EC, OC and IC

Note 1 to entry: The amount of TC released from a PM sample in the specified thermal desorption and oxidation process may be different from other analytical methods.

3.1.2
inorganic carbon
IC
fraction of carbon belonging to mineral species, including carbonates and other species

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