Irish Standard
I.S. EN 16909:2017

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

I.S. EN 16909:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:	*Published:*
EN 16909:2017	2017-03-01

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2017-03-24	13.040.20
	NOTE: If blank see CEN/CENELEC cover page

NSAI	T +353 1 807 3800	Sales:
1 Swift Square,	F +353 1 807 3838	T +353 1 857 6730
Northwood, Santry	E standards@nsai.ie	F +353 1 857 6729
Dublin 9	W NSAI.ie	W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN 16909:2017 is the adopted Irish version of the European Document EN 16909:2017, Ambient air - Measurement of elemental carbon (EC) and organic carbon (OC) collected on filters

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

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)

This European Standard was approved by CEN on 2 January 2017.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 16909:2017 E

Contents

Page

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.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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.

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/cm^2, and the subsequent calculation of concentrations as µg/m^3. 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}/cm^2 and 1,8 µg C_{OC}/cm^2 to 38 µg C_{EC}/cm^2 and 49 µg C_{OC}/cm^2 in the laboratory and to 16 µg C_{EC}/cm^2 and 45 µg C_{OC}/cm^2 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