PD CEN/TS 16115-2:2016

BSI Standards Publication

Ambient air — Measurement of bioaerosols

Part 2: Planning and evaluation of plant-related plume measurements

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National foreword

This Published Document is the UK implementation of CEN/ TS 16115-2:2016.

The UK participation in its preparation was entrusted to Technical Committee EH/2/3, Ambient Atmospheres.

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

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Published by BSI Standards Limited 2016

ISBN 978 0 580 90168 3

ICS 13.040.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 December 2016.

Amendments/corrigenda issued since publication

Date	Text affected

TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

CEN/TS 16115-2

December 2016

ICS 13.040.20

English Version

Ambient air - Measurement of bioaerosols - Part 2: Planning and evaluation of plant-related plume measurements

Qualité de l'air ambiant - Mesurage de bioaérosols - Partie 2 : Planification et évaluation des mesurages dans le panache de fumée des installations industrielles

Außenluft - Messen von Bioaerosolen - Teil 2: Planung und Auswertung von anlagenbezogenen Fahnenmessungen

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European foreword

This document (CEN/TS 16115-2:2016) 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 shall not be held responsible for identifying any or all such patent rights.

CEN/TS 16115 consists of several parts dealing with the determination of bioaerosols in ambient air:

— *Part 1: Determination of moulds using filter sampling systems and culture-based analyses;*

— *Part 2: Planning and evaluation of plant-related plume measurements.*

The basic requirements of the determination of bioaerosols are first published as Technical Specifications. The precision and the performance characteristics of bioaerosol measurements should be determined in comparison and validation trials in order to validate the method(s). Based on the validation results the Technical Specifications can be transferred to European Standards. For this purpose it is intended to apply for mandated support by the European Commission and the European Free Trade Association using the Technical Specifications as a basis for validation measurements.

According to the CEN/CENELEC Internal Regulations, the national standards organisations 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

Airborne particles of biological origin are called bioaerosols. Natural and anthropogenic sources for bioaerosols are widely distributed in the environment. Anthropogenic sources can for example be agriculture or waste treatment activities.

The purpose the measurement planning here described is to determine the mean plant- and/or source-related impact range of microbial air pollutants. As it has so far not been possible to set limit values based on dose-response relationships, the mean impact range is to be used as a criterion for assessing the environmental impact of a plant.

The scale of work for the plume measurements here described is necessary to obtain statistically representative data about the impact range of the plant and/or source, taking into account the great variety of influencing factors. Whilst a reduced measurement effort is possible in principle, this will lead to an increased measurement uncertainty.

The objective of measurement planning is to analyse a given measurement problem and derive the associated requirements for organization, the measurement method, the sampling strategy, the evaluation of the measured data, quality assurance and reporting.

The requirements set out in this technical specification are to ensure that plant-related ambient air measurements of microbial air pollution are planned in such a way as to enable a given task to be processed with sufficient accuracy and at justifiable cost. The aim is to ensure that the measured data obtained meet the applicable standards for representativeness and hence, enable maximum possible comparability.

The procedure described in this document is based on VDI 4251 Part 1 [1].

1 Scope

This document describes the general requirements to be taken into account in planning and implementing plant-related plume measurements of microbial air pollutants. A basic principle of this method is to compare the concentrations in air unaffected by the activities of the plant (i.e. background air sampled upwind of the plant) with the concentration of bioaerosols in air downwind of the plant. It is this comparison that allows an assessment of the plant-related contribution and the mean spatial impact range to be made. As it has so far not been possible to set limit values based on dose-response relationships, the mean impact range is to be used as a first criterion for assessing the environmental impact of a plant.

The scale of work for the plume measurements described is necessary to obtain statistically representative data about the impact range of the plant and/or source, taking into account the great variety of influencing factors.

Plant-related measurements of bioaerosol concentrations in ambient air may be required in a number of regulatory situations. Examples of typical measurement objectives and indicative application scenarios are presented in the document. This method specifies the simultaneous measurement of background and downwind air quality to reduce the risk of invalid comparisons resulting from changing background air concentrations. Another important principle of this method is the requirement for repeated measures to take into account day to day and seasonal variations in the processes governing bioaerosol emissions and dispersion.

The objective is to analyse a given measurement problem and derive the associated requirements for organization, the measurement method, the sampling strategy, the evaluation of the measured data, quality assurance and reporting.

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.

CEN/TS 16115-1, *Ambient air quality - Measurement of bioaerosols - Part 1: Determination of moulds using filter sampling systems and culture-based analyses*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

EN 13098:2000, *Workplace atmosphere - Guidelines for measurement of airborne micro-organisms and endotoxin*

3 Terms and definitions

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

3.1
additional impact
contribution of the plant under study to the ambient air pollution at a receptor point

3.2
area source
emitting area of a relevant size, normally horizontally orientated; area sources are distinguished into sources *with* a defined volumetric flow rate (e.g. biofilter, aerated composting windrow) and sources *without* defined volumetric flow rate (e.g. landfills, agricultural land)