Irish Standard
I.S. EN 16841-1:2016

Ambient air - Determination of odour in ambient air by using field inspection - Part 1: Grid method

I.S. EN 16841-1:2016

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 16841-1:2016	2016-11-23

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2016-12-12	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 16841-1:2016 is the adopted Irish version of the European Document EN 16841-1:2016, Ambient air - Determination of odour in ambient air by using field inspection - Part 1: Grid method

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

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 16841-1

November 2016

ICS 13.040.20

English Version

Ambient air - Determination of odour in ambient air by using field inspection - Part 1: Grid method

Air ambiant - Détermination de la présence d'odeurs par mesures de terrain - Partie 1 : Méthode de la grille

Außenluft - Bestimmung von Geruchsstoffimmissionen durch Begehungen - Teil 1: Rastermessung

This European Standard was approved by CEN on 10 September 2016.

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, 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

Contents

Page

European foreword ... 3
Introduction ... 4
1 Scope ... 5
2 Normative references ... 5
3 Terms and definitions ... 5
4 Symbols and abbreviations ... 9
5 Principle of measurement ... 10
6 Coordinator, assessors and panel members ... 14
6.1 Measurement leader and field observations coordinator ... 14
6.2 Assessors and panel members ... 14
6.3 Panel instruction ... 15
7 Planning of measurements and measurement procedure ... 16
7.1 Health and safety ... 16
7.2 Planning and performance of the field survey ... 16
8 Data recording and calculation ... 25
8.1 Data recording and calculating the percentage odour time ... 25
8.2 Criterion for positive single measurement (odour hour) ... 25
8.3 Calculation of the odour hour frequency ... 25
9 Measurement uncertainty ... 27
9.1 General aspects ... 27
9.2 Calculation of the uncertainty of the odour hour frequency in an assessment square ... 28
10 Reporting of results ... 29
Annex A (informative) Overview and interaction of existing odour measurement methods ... 31
Annex B (informative) Training of assessors and instructions prior to grid measurements ... 32
Annex C (informative) Examples for instructions and sheets ... 35
Annex D (informative) Example of the planning and evaluation of a grid measurement ... 38
Annex E (informative) Example for check of temporal representativeness ... 43
Annex F (informative) Example for check of spatial meteorological representativeness ... 45
Annex G (informative) Evaluation of odour hours and odour frequencies per assessment square ... 47
Annex H (informative) Calculation of the uncertainty of a grid measurement ... 51
Bibliography ... 57

European foreword

This document (EN 16841-1:2016) 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 May 2017, and conflicting national standards shall be withdrawn at the latest by May 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.

EN 16841, *Ambient air - Determination of odour in ambient air by using field inspection* consists of the following parts:

— *Part 1: Grid method*

— *Part 2: Plume method*

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Part 1 (grid method) and Part 2 (plume method) of this European Standard describe methods for direct assessment of odours in ambient air.

This European Standard supplements the dynamic olfactometry method described in EN 13725 which is generally only suitable for measurement of odour emissions at source. As the practical lower detection limit is typically ≥ 10 ou_E/m^3, EN 13725 cannot be applied to directly determine odour exposure in the field (i.e. measure faint odours at the concentration where they can just be recognized).

The methods for measuring odour presented in this European Standard make direct use of odour perception, the effect of odorants on the human sense of smell. The standard involves the use of qualified human panel members in the field to directly assess the presence of recognizable odour in ambient air, and provide data that can be used to characterize odour exposure in a defined assessment area. The standard presents two key approaches summarized as follows:

— Part 1 (presented in this document) describes a **grid method** which uses direct assessment of ambient air by panel members to characterize odour exposure in a defined assessment area.

— Part 2 describes a **plume method** to characterize the presence of odour by determining the extent of the downwind odour plume of a source.

Although the ultimate application of this method is in monitoring the risk of exposure to odours and the resulting odour annoyance, there is no direct relation between the presence of recognizable odours and the occurrence of odour annoyance. The process leading to odour annoyance being experienced by an individual or a community is highly complex. Additional investigations are necessary to establish a link between odour exposure and the risk of odour annoyance, which is profoundly influenced by odour exposure frequency, by the type and hedonic tone of the odour perceived, and by the characteristics of those exposed to the odour (the receptor). The relationship between odour exposure and annoyance is not within the scope of this European Standard.

The sensory methods described here are only suitable for the assessment of odour in ambient air. They are not suitable for the assessment of substances that cannot be detected by sensory methods, in particular when these substances may cause health effects not directly related to their perceived smell.

1 Scope

This part of the European Standard describes the grid method for the determination of the level of odour exposure in ambient air. It provides a set of instructions for measurement of ambient odour exposure within a defined assessment area, using qualified human panel members, over a sufficiently long period of time to be representative for the meteorological conditions of that location, and hence determine the distribution of the frequency of exposure to odours within the assessment area. The sources of the odorant under study may be located within or outside the assessment area.

The primary application of this European Standard is to provide a common basis for evaluation of exposure to ambient odours in the member states of the European Union. The field of application of this type of measurement is to characterize the level of odour exposure within the study area, in order to assess whether the impact of that exposure on resident population could be a justified cause for annoyance, using exposure criteria. The unit of measurement of the method is the frequency of odour hours for an assessment square, defined by four measurement points as a representative value for odour exposure for local conditions, e.g. local odour sources and the meteorology of that location.

This European Standard does not include:

— the measurement of intensity of ambient odours,

— the measurement of hedonic tone of ambient odours,

— the calculation of odour exposure in specific weather conditions in order to determine the frequency distribution of recognizable odour in an odorant plume,

— the calculation of estimated source emission rate from plume assessment using reverse dispersion modelling.

An overview of the interaction between existing odour exposure assessment methods is given in Annex A, including grid method (Part 1), plume method (Part 2) and olfactometry according to EN 13725.

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 13725:2003, *Air quality - Determination of odour concentration by dynamic olfactometry*

3 Terms and definitions

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

3.1
assessment area
area which covers all assessment squares of a grid

Note 1 to entry: The size and shape depend on the objective of the assessment and on the number and type of odorant sources that have an influence on the odour exposure in the area of study.

3.2
assessment square
element of the assessment area, defined by four adjoining measurement points on the grid

Note 1 to entry: Assessment squares are only necessary at locations where an odour assessment is required. These are generally residential areas or stand-alone houses.