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CEN/TS 1948-5

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English Version

Stationary source emissions - Determination of the mass concentration of PCDDs/PCDFs and dioxin-like PCBs - Part 5: Long-term sampling of PCDDs/PCDFs and PCBs

Emissions de sources fixes - Détermination de la concentration massique en PCDD/PCDF et PCB de type dioxine - Partie 5: Prélèvement à long-terme de PCDD/PCDF et PCB

Emissionen aus stationären Quellen - Bestimmung der Massenkonzentration von PCDD/PCDF und dioxinähnlichen PCB - Teil 5: Langzeitprobenahme von PCDD/PCDF und PCB

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (CEN/TS 1948-5:2015) has been prepared by Technical Committee CEN/TC 264 “Air quality”, the secretariat of which is held by DIN.

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Introduction

EN 1948-1, EN 1948-2, EN 1948-3 and EN 1948-4 describe reference methods for the determination of PCDD/PCDF/PCB, whereas this Technical Specification gives requirements for long-term sampling measurements in connection with the appropriate analytical methods (equivalent method). In contrast to the standard reference method (EN 1948-1) which refers to monitoring the limit value for compliance with emission limit values (ELVs) in Directives, such as Industrial Emission Directive (IED) [10], the long-term sampling is intended to determine the average concentration level during a longer period (see e.g. [12], [13]). CEN/TS 1948-5 provides a method for measuring long term average mass concentrations but it does not specify its potential use by the competent authority for demonstrating compliance with long term ELVs.

Long-term sampling methods are not automatic measurement methods and do not provide continuous emission monitoring data (real time display).

This Technical Specification in connection with EN 1948-2 and EN 1948-3 (extraction and analysis) are necessary for the performance of long-term sampling of PCDDs/PCDFs/ PCBs.

In some European Union countries PCDD/PCDF/PCB long-term sampling is an obligatory measurement for some incineration processes. In other countries of the European Union this may be obligatory in the future.

The European Organization for Standardization (CEN) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning the use of PCDD/PCDF/PCB long-term sampling systems, described in this document. This is valid for

a) the filter/condenser method (see 5.2) and

b) the cooled probe method (see 5.4).

CEN takes no position concerning the evidence, validity and scope of these patent rights.

The holder of this patent right has ensured CEN and CENELEC that he is willing to negotiate licenses under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with CEN and CENELEC. Information may be obtained from:

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http://www.cencenelec.eu/ipr/Patents/Pages/default.aspx maintains online databases of patents relevant to its documents. Users are encouraged to consult the databases for the most up to date information concerning patents.

It should be mentioned that also a patent right existed for the dilution method (see 5.3). This patent was phased out in September 2014.

In Reference [1] the results of a round robin test for long-term sampling are presented.

WARNING All relevant national safety regulations shall be observed. The 2,3,7,8-chlorine substituted PCDDs/PCDFs belong to the most toxic of chemicals. In addition working at the sampling site may include exposure to a range of hazards such as poisonous/asphyxiating flue gases and working at heights. Appropriate measures shall be taken to minimize exposure to such hazards. Care shall be taken when transporting samples to avoid their breakage both to prevent contamination and to avoid sample losses.

1 Scope

This Technical Specification specifies the long-term sampling of PCDDs, PCDFs and PCBs. There are three different sampling methods, which use the three different principles described in EN 1948-1 modified for long-term sampling requirements:

— filter/condenser method;

— dilution method;

— cooled probe method.

Each sampling method is illustrated in detail in Annex D. The sampling methods described in this document are designed for a sampling duration of typically four weeks.

Additionally this document specifies a framework of quality control requirements for any long-term sampling method to be applied (see Annex C and Annex F).

With the methods described experiences were gained for a concentration range from typically 0,003 ng I-TEQ/m^3 up to 4,0 ng I-TEQ/m^3 and 0,003 ng WHO-TEQ/m^3 up to 4,0 ng WHO-TEQ/m^3 respectively at different stationary sources (e.g. waste incinerators, sinter plants, cement kilns).

For the complete measurement method the use of EN 1948-2 and EN 1948-3 describing extraction and clean-up and identification and quantification, respectively, is necessary in order to determine PCDDs/PCDFs. Also EN 1948-4 is necessary for the analyses of dioxin-like PCBs.

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 1948-1:2006, *Stationary source emissions - Determination of the mass concentration of PCDDs/PCDFs and dioxin-like PCBs - Part 1: Sampling of PCDDs/PCDFs*

EN 1948-2:2006, *Stationary source emissions - Determination of the mass concentration of PCDDs/PCDFs and dioxin-like PCBs - Part 2: Extraction and clean-up of PCDDs/PCDFs*

EN 1948-3:2006, *Stationary source emissions - Determination of the mass concentration of PCDDs/PCDFs and dioxin-like PCBs - Part 3: Identification and quantification of PCDDs/PCDFs*

EN 1948-4:2010+A1:2013, *Stationary source emissions - Determination of the mass concentration of PCDDs/PCDFs and dioxin-like PCBs - Part 4: Sampling and analysis of dioxin-like PCBs*

EN 13284-1:2001, *Stationary source emissions - Determination of low range mass concentration of dust - Part 1: Manual gravimetric method*

EN 15259:2007, *Air quality - Measurement of stationary source emissions - Requirements for measurement sections and sites and for the measurement objective, plan and report*

EN 15267-1, *Air quality - Certification of automated measuring systems - Part 1: General principles*

EN 15267-2, *Air quality - Certification of automated measuring systems - Part 2: Initial assessment of the AMS manufacturer's quality management system and post certification surveillance for the manufacturing process*

EN 15267-3:2007, *Air quality - Certification of automated measuring systems - Part 3: Performance criteria and test procedures for automated measuring systems for monitoring emissions from stationary sources*

EN ISO 16911-1:2013, *Stationary source emissions - Manual and automatic determination of velocity and volume flow rate in ducts - Part 1: Manual reference method (ISO 16911-1:2013)*

3 Terms and definitions

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

3.1
sampling unit
different media including adsorber, absorber and filter in order to collect the PCDDs/PCDFs/PCBs

Note 1 to entry: Each sampling system may use different collection systems to collect PCDD/PCDF and PCBs in the gaseous and particulate form (e.g. filter, cartridge with sorbent). In this standard the whole collection system is considered as the sampling unit which is send to the laboratory for analysis.

3.2
long-term sampling system
system to sample up to typically four weeks

3.3
standard reference method
SRM
sampling according to EN 1948-1 and extraction/clean-up/analysis according to EN 1948-2 and EN 1948-3

3.4
stand by
interruption of the measurement period due to plant shut down or during the changing of sampling support (filters and adsorbant)

3.5
yearly PCDD/PCDF/PCB surveillance
several repeated long-term PCDD/PCDF/PCB measurements during 1 year

3.6
standard flue gas sample volume
flue gas sample volume expressed at standard conditions of temperature (273,15 K) and pressure (101,3 kPa) on a dry basis and if required corrected to the reference concentration of oxygen

3.7
isokinetic sampling
sampling at a flow rate such that the velocity (amount and direction) of the gas entering the sampling nozzle are the same as the velocity of the gas in the duct at the sampling point

3.8
sampling standard
$^{13}C_{12}$-labelled 2,3,7,8-chlorine substituted PCDFs/PCB added before sampling

3.9
extraction standard
$^{13}C_{12}$-labelled 2,3,7,8-chlorine substituted PCDDs/PCDFs/PCB, added before extraction

Note 1 to entry: These standards are also used for calculation of results.