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Indoor air —

Part 33: Determination of phthalates with gas chromatography/mass spectrometry (GC/MS)

Air intérieur —

Partie 33: Détermination des phthalates par chromatographie en phase gazeuse/spectrométrie de masse (CPG/SM)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 6, *Indoor air*.

This second edition cancels and replaces the first edition (ISO 16000-33:2017), which has been technically revised.

The main change is as follows: a description of an adsorbent which can alternatively be used has been added.

A list of all parts in the ISO 16000 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Different parts of the ISO 16000 series describe the general requirements relating to the measurement of indoor air pollutants and the important conditions to be observed before or during the sampling of individual pollutants or groups of pollutants, as well as the measurement procedures themselves.

The definition of indoor environment is given by ISO 16000-1. Dwellings [living rooms, bedrooms, do-it-yourself (DIY) rooms, sports rooms and cellars, kitchens and bathrooms], workrooms or workplaces in buildings which are not subject to health and safety inspections with respect to air pollutants (e.g. offices, salesrooms), public buildings (e.g. restaurants, theatres, cinemas and other meeting rooms) and passenger cabins of motor vehicles and public transport are among the most important types of indoor environment.

Phthalates, the diesters of the ortho-phthalic acid (1,2-benzene dicarboxylic acid), are emitted into the indoor air primarily from articles of daily use made of soft polyvinyl chloride (PVC). Typically, phthalates are used as plasticizers in soft PVC. Four most frequently used phthalates are diisodecylphthalate (DiDP), diisononylphthalate (DiNP), di-2-ethylhexyl terephthalate (DOTP) and di-isononyl cyclohexane dicarboxylate (DINCH) but other families of esters are available. Di(2-ethylhexyl)-phthalate (DEHP), di-n-butyl-phthalate (DBP) and benzyl-n-butyl-phthalate (BBP) were used in Europe until more recent regulatory developments placed restrictions on their use in the manufacture of new articles. However, these can still be present in articles currently in use and are subject to assessment. An overview of the most important phthalates, their acronyms and several relevant substance properties can be found in Table A.1. These phthalates can be determined in indoor environments by means of the analytical methods incorporating gas chromatography-mass spectrometry specified in this document.

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Indoor air —

Part 33: Determination of phthalates with gas chromatography/mass spectrometry (GC/MS)

1 Scope

This document specifies the sampling and analysis of phthalates in indoor air and describes the sampling and analysis of phthalates in house dust and in solvent wipe samples of surfaces by means of gas chromatography-mass spectrometry (GC-MS).

Two alternative sampling, sample preparation and sample introduction methods, whose comparability has been proven in an interlaboratory test, are specified for indoor air[1]:

— sorbent tubes sampling with subsequent thermal desorption GC-MS, and

— sampling by adsorption and subsequent solvent extraction and injection to GC-MS.

Additional adsorbents that can be used are described in Annex B.

Depending on the sampling method, the compounds dimethyl phthalate to diisoundecylphthalate can be analysed in house dust as described in Annex D[2]. The investigation of house dust samples is only appropriate as a screening method. This investigation only results in indicative values and is not acceptable for a final assessment of a potential need for action.

Dimethyl phthalate to diisoundecylphthalate can be analysed in solvent wipe samples as described in Annex C. Solvent wipe samples are suitable for non-quantitative source identification.

NOTE In principle, the method is also suitable for the analysis of other phthalates, adipates and cyclohexane dicarboxylic acid esters, but this is confirmed by determination of the performance characteristics in each case.

General information on phthalates are given in Annex A.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 16000-6, *Indoor air — Part 6: Determination of organic compounds (VVOC, VOC, SVOC) in indoor and test chamber air by active sampling on sorbent tubes, thermal desorption and gas chromatography using MS or MS FID*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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