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**Določevanje posameznih substanc v elektrotehniških izdelkih - 8. del: Ftalati v polimerih s plinsko kromatografijo-masno spektrometrijo (GC-MS), plinsko kromatografijo-masno spektrometrijo z uporabo pirolize/toplotne desorpcije (Py/TD-GC-MS)**

Determination of certain substances in electrotechnical products - Part 8: Phthalates in polymers by gas chromatography-mass spectrometry (GC-MS), gas chromatography-mass spectrometry using a pyrolyzer/thermal desorption accessory (Py/TD-GC-MS)

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**Determination of certain substances in electrotechnical products  
- Part 8: Phthalates in polymers by gas chromatography-mass  
spectrometry (GC-MS), gas chromatography-mass spectrometry  
using a pyrolyzer/thermal desorption accessory (Py/TD-GC-MS)  
(IEC 62321-8:2017)**

Détermination de certaines substances dans les produits  
électrotechniques - Partie 8: Analyse des phtalates dans les  
polymères par chromatographie en phase gazeuse-  
spectrométrie de masse (GC-MS), chromatographie en  
phase gazeuse-spectrométrie de masse par  
pyrolyse/thermodésorption (Py/TD-GC-MS)  
(IEC 62321-8:2017)

Verfahren zur Bestimmung von bestimmten Substanzen in  
Produkten der Elektrotechnik - Teil 8: Phthalate in  
Polymeren mit Pyrolyse-Gaschromatographie-  
Massenspektrometrie (Py-GC-MS), Ionen-Anlagerungs-  
Massenspektrometrie (IAMS), Gaschromatographie-  
Massenspektrometrie (GC-MS) und  
Flüssigchromatographie-Massenspektrometrie (LC-MS)  
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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

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

**EN 62321-8:2017****European foreword**

The text of document 111/416/CDV, future edition 1 of IEC 62321-8, prepared by IEC/TC 111 "Environmental standardization for electrical and electronic products and systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62321-8:2017.

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

ISO 3696 NOTE Harmonized as EN ISO 3696.

ISO/IEC 17025 NOTE Harmonized as EN ISO/IEC 17025.

IEC 62321-2:2013 NOTE Harmonized as EN 62321-2:2014.

IEC 62321-6:2015 NOTE Harmonized as EN 62321-6:2016

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62321-1	2013	Determination of certain substances in electrotechnical products -- Part 1: Introduction and overview	EN 62321-1	2013

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# INTERNATIONAL STANDARD

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**Determination of certain substances in electrotechnical products –  
Part 8: Phthalates in polymers by gas chromatography-mass spectrometry  
(GC-MS), gas chromatography-mass spectrometry using a pyrolyzer/thermal  
desorption accessory (Py/TD-GC-MS)**

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**Détermination de certaines substances dans les produits électrotechniques –  
Partie 8: Analyse des phtalates dans les polymères par chromatographie en  
phase gazeuse-spectrométrie de masse (GC-MS), chromatographie en phase  
gazeuse-spectrométrie de masse par pyrolyse/thermodésorption (Py/TD-GC-MS)**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

# DETERMINATION OF CERTAIN SUBSTANCES IN ELECTROTECHNICAL PRODUCTS –

## Part 8: Phthalates in polymers by gas chromatography-mass spectrometry (GC-MS), gas chromatography-mass spectrometry using a pyrolyzer/thermal desorption accessory (Py/TD-GC-MS)

## FOREWORD

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The text of this International Standard is based on the following documents:

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111/416/CDV	111/430/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62321 series, published under the general title: *Determination of certain substances in electrotechnical products*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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## INTRODUCTION

The widespread use of electrotechnical products has drawn increased attention to their impact on the environment. In many countries all over the world this has resulted in the adaptation of regulations affecting wastes, substances and energy use of electrotechnical products.

The use of certain substances (e.g. lead (Pb), cadmium (Cd), polybrominated diphenyl ethers (PBDEs) and specific phthalates) in electrotechnical products is a source of concern in current and proposed regional legislation.

The purpose of the IEC 62321 series is therefore to provide test methods that will allow the electrotechnical industry to determine the levels of certain substances of concern in electrotechnical products on a consistent global basis.

This first edition of IEC 62321-8 introduces a new part in the IEC 62321 series.

**WARNING** – Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

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## DETERMINATION OF CERTAIN SUBSTANCES IN ELECTROTECHNICAL PRODUCTS –

### Part 8: Phthalates in polymers by gas chromatography-mass spectrometry (GC-MS), gas chromatography-mass spectrometry using a pyrolyzer/thermal desorption accessory (Py/TD-GC-MS)

#### 1 Scope

This part of IEC 62321 specifies two normative and two informative techniques for the determination of di-isobutyl phthalate (DIBP), di-n-butyl phthalate (DBP), benzylbutyl phthalate (BBP), di-(2-ethylhexyl) phthalate (DEHP), di-n-octyl phthalate (DNOP), di-isononyl phthalate (DINP) and di-iso-decyl phthalate (DIDP) in polymers of electrotechnical products.

Gas chromatography-mass spectrometry (GC-MS) and gas chromatography-mass spectrometry (Py/TD-GC-MS) techniques are described in the normative part of this document.

The GC-MS method is considered the referee technique for the quantitative determination of DIBP, DBP, BBP, DEHP, DNOP, DINP and DIDP in the range of 50 mg/kg to 2 000 mg/kg.

The GC-MS coupled with a pyrolyzer/thermal desorption (TD) accessory is suitable for screening and semi-quantitative analysis of DIBP, DBP, BBP, DEHP, DNOP, DINP, and DIDP in polymers that are used as parts of the electrotechnical products in the range of 100 mg/kg to 2 000 mg/kg.

The IAMS technique is suitable for screening and semi-quantitative analysis of DIBP, DBP, BBP, DEHP, DNOP, DINP, and DIDP. Determination of DBP and DIBP, DEHP and DNOP by IAMS has not been established due to peak and mass spectral resolution limitations.

The LC-MS technique is limited to the determination of BBP, DEHP, DNOP, DINP, and DIDP. Determination of DBP and DIBP by LC-MS has not been established due to peak and mass spectral resolution limitations.

A flow chart depicting how the normative Py/TD-GC-MS and GC-MS methods and informative methods using ion attachment mass spectrometry (IAMS) coupled with direct injection probe (DIP) and liquid chromatography-mass spectrometry (LC-MS) can be used are provided in annexes of this document.

These four test methods have been evaluated by the test of PE (polyethylene) and PVC (polyvinyl chloride) materials containing individual phthalates between ~450 mg/kg to 30 000 mg/kg as depicted in the normative and informative parts of this document. The use of the four methods described in this document for other polymer types, phthalate compounds or concentration ranges other than those specified above has not been specifically evaluated.

#### 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.

IEC 62321-1:2013, *Determination of certain substances in electrotechnical products – Part 1: Introduction and overview*