

SLOVENSKI STANDARD
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Določevanje posameznih substanc v elektrotehniških izdelkih - 6. del: Določevanje polibromiranih bifenilov in polibromiranih difeniletrov v polimerih s plinsko kromatografijo-masno spektrometrijo (GC-MS) - Masna spektrometrija s pripenjanjem iona (IAMS) in tekočinska kromatografija visoke ločljivosti z UV-detekcijo (HPLC-UV) (IEC 62321-6:2015)

Determination of certain substances in electrotechnical products - Part 6: Polybrominated biphenyls and polybrominated diphenyl ethers in polymers by gas chromatography-mass spectrometry (GC-MS) - Ion Attachment Mass Spectrometry (IAMS) and High Pressure Liquid Chromatography - Ultra Violet detection (HPLC-UV) (IEC 62321-6:2015)

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Verfahren zur Bestimmung von bestimmten Substanzen in Produkten der Elektrotechnik - Teil 6: Polybromierte Biphenyl- und Diphenylether in Polymeren durch Gaschromatographie-Massenspektrometrie (GC-MS) (IEC 62321-6:2015)

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| 29.020 | Elektrotehnika na splošno | Electrical engineering in general |
| 31.020 | Elektronske komponente na splošno | Electronic components in general |
| 71.040.50 | Fizikalnokemijske analitske metode | Physicochemical methods of analysis |

SIST EN 62321-6:2015**en**

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Determination of certain substances in electrotechnical products
- Part 6: Polybrominated biphenyls and polybrominated diphenyl
ethers in polymers by gas chromatography-mass spectrometry
(GC-MS)
(IEC 62321-6:2015)

Détermination de certaines substances dans les produits
électrotechniques - Partie 6: Diphényles polybromés et
diphényléthers polybromés dans des polymères par
chromatographie en phase gazeuse-spectrométrie de
masse (GC-MS)
(IEC 62321-6:2015)

Verfahren zur Bestimmung von bestimmten Substanzen in
Produkten der Elektrotechnik - Teil 6: Polybromierte
Biphenyl- und Diphenylether in Polymeren durch
Gaschromatographie-Massenspektrometrie (GC-MS)
(IEC 62321-6:2015)

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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 62321-6:2015**European foreword**

The text of document 111/368/FDIS, future edition 1 of IEC 62321-6, 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 62321-6:2015.

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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

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|---|--------------|-------------|
| IEC 62321 | 2008 | Electrotechnical products - Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers) | EN 62321 | 2009 |
| IEC 62321-1 | 2013 | Determination of certain substances in electrotechnical products - Part 1: Introduction and overview | EN 62321-1 | 2013 |
| IEC 62321-2 | 2013 | Determination of certain substances in electrotechnical products - Part 2: Disassembly, disjunction and mechanical sample preparation | EN 62321-2 | 2014 |

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**Determination of certain substances in electrotechnical products –
Part 6: Polybrominated biphenyls and polybrominated diphenyl ethers in
polymers by gas chromatography–mass spectrometry (GC-MS)**

**Détermination de certaines substances dans les produits électrotechniques –
Partie 6: Diphényles polybromés et diphényléthers polybromés dans des
polymères par chromatographie en phase gazeuse–spectrométrie de masse
(GC-MS)**

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CONTENTS

| | |
|---|----|
| FOREWORD..... | 6 |
| INTRODUCTION..... | 8 |
| 1 Scope..... | 9 |
| 2 Normative references..... | 9 |
| 3 Terms, definitions and abbreviations | 10 |
| 3.1 Terms and definitions | 10 |
| 3.2 Abbreviations | 10 |
| 4 Principle..... | 11 |
| 5 Reagents and materials | 11 |
| 6 Apparatus..... | 11 |
| 7 Sampling..... | 12 |
| 8 Procedure | 12 |
| 8.1 General instructions for the analysis | 12 |
| 8.2 Sample preparation | 12 |
| 8.2.1 Stock solution | 12 |
| 8.2.2 Pre-extraction of the Soxhlet extractors | 13 |
| 8.2.3 Extraction | 13 |
| 8.2.4 Alternative extraction procedures for soluble polymers | 13 |
| 8.2.5 Addition of the internal standard (IS) | 14 |
| 8.3 Instrumental parameters..... | 14 |
| 8.4 Calibrants | 16 |
| 8.5 Calibration | 17 |
| 8.5.1 General | 17 |
| 8.5.2 PBB (1 µg/ml for each congener), PBDE (1 µg/ml for each congener) and surrogate standard (1 µg/ml) stock solution..... | 18 |
| 8.5.3 Standard solutions | 18 |
| 9 Calculation of PBB and PBDE concentration | 19 |
| 9.1 General..... | 19 |
| 9.2 Calculation..... | 19 |
| 10 Precision | 21 |
| 10.1 Threshold judgement..... | 21 |
| 10.2 Repeatability and reproducibility..... | 22 |
| 11 Quality assurance and control..... | 22 |
| 11.1 Resolution..... | 22 |
| 11.2 Performance | 23 |
| 11.3 Limit of detection (LOD) or method detection limit (MDL) and limit of quantification (LOQ)..... | 24 |
| 12 Test report..... | 25 |
| Annex A (informative) Determination of PBB and PBDE in polymers by ion attachment mass spectrometry (IAMS)..... | 26 |
| A.1 Principle | 26 |
| A.2 Reagents and materials..... | 26 |
| A.3 Apparatus | 26 |
| A.4 Sampling..... | 27 |
| A.4.1 General | 27 |
| A.4.2 Qualitative stage..... | 27 |

| | | |
|-----------------------|--|----|
| A.4.3 | Semi-quantitative stage..... | 27 |
| A.5 | Procedure..... | 27 |
| A.5.1 | General instructions for the analysis..... | 27 |
| A.5.2 | Sample preparation..... | 27 |
| A.5.3 | Instrumental parameters..... | 28 |
| A.5.4 | Calibrants..... | 29 |
| A.5.5 | Calibration..... | 29 |
| A.6 | Calculation of PBB and PBDE concentration..... | 30 |
| A.6.1 | General..... | 30 |
| A.6.2 | Calculation..... | 31 |
| A.6.3 | Judgement of ambiguous spectrum..... | 32 |
| A.7 | Precision..... | 34 |
| A.7.1 | Threshold judgement..... | 34 |
| A.7.2 | Repeatability and reproducibility..... | 34 |
| A.8 | Quality assurance and control..... | 35 |
| A.8.1 | Sensitivity..... | 35 |
| A.8.2 | Recovery..... | 35 |
| A.8.3 | Blank test..... | 36 |
| A.8.4 | Limits of detection (LOD) and limits of quantification (LOQ)..... | 36 |
| A.9 | Test report..... | 36 |
| Annex B (informative) | Diagram of an IAMS instrument..... | 37 |
| Annex C (informative) | Determination of PBB and PBDE in polymers by high-pressure liquid chromatography – Ultra violet detection (HPLC-UV)..... | 38 |
| C.1 | Principle..... | 38 |
| C.2 | Reagents and materials..... | 38 |
| C.3 | Apparatus..... | 38 |
| C.4 | Sampling..... | 39 |
| C.5 | Procedure..... | 39 |
| C.5.1 | General instructions for the analysis..... | 39 |
| C.5.2 | Sample preparation..... | 39 |
| C.5.3 | Instrumental parameters..... | 40 |
| C.5.4 | Calibrants..... | 40 |
| C.6 | Calibration..... | 41 |
| C.6.1 | General..... | 41 |
| C.6.2 | Standard solutions..... | 41 |
| C.7 | Calculation of PBB and PBDE concentration..... | 42 |
| C.7.1 | General..... | 42 |
| C.7.2 | Calculation..... | 42 |
| C.8 | Precision..... | 43 |
| C.8.1 | Threshold judgement..... | 43 |
| C.8.2 | Repeatability and reproducibility..... | 43 |
| C.9 | Quality assurance and control..... | 44 |
| C.9.1 | Standards spike recovery..... | 44 |
| C.9.2 | Internal control samples and blanks..... | 44 |
| C.9.3 | Limits of detection (LOD) and limits of quantification (LOQ)..... | 45 |
| C.10 | Test report..... | 45 |
| Annex D (informative) | Examples of chromatograms at suggested conditions..... | 46 |
| D.1 | GC-MS method..... | 46 |
| D.2 | IAMS method..... | 48 |

| | |
|---|----|
| D.3 HPLC-UV method..... | 52 |
| Annex E (informative) Example applicability of the IAMS, HPLC and GC-MS test methods | 53 |
| Annex F (informative) Results of international interlaboratory study 4B (IIS4B)..... | 54 |
| Bibliography | 57 |
| | |
| Figure A.1 – Mass spectra of Deca BB and TBBA obtained in scan mode and profile mode..... | 33 |
| Figure A.2 – Identification of Tetra-BDE and Penta-BDE by isotope pattern recognition..... | 33 |
| Figure B.1 – Diagram of an IAMS instrument..... | 37 |
| Figure D.1 – Total ion chromatogram of PBDE mixture, BDE-1 to BDE-206 (5 µg/ml), BDE-209 (50 µg/ml) | 47 |
| Figure D.2 – Total ion chromatogram of PBB mixture (3,5 µg/ml) | 47 |
| Figure D.3 – Total ion chromatogram of PBB and PBDE mixtures (BDE-1 to BDE-206 5 µg/ml, BDE-209 50 µg/ml, PBBs 3,5 µg/ml) | 48 |
| Figure D.4 – Mass spectrum of each PBDE congener by IAMS-1 (TriBDE to HexaBDE) | 49 |
| Figure D.5 – Mass spectrum of each PBDE congener by IAMS-2 (HeptaBDE to DecaBDE) | 49 |
| Figure D.6 – Mass spectra of technical OctaBDE(a) as mixture..... | 50 |
| Figure D.7 – Temperature programmed chromatography of each PBDE congener in the quantitative analysis of the reference material (ERM EC-590)..... | 51 |
| Figure D.8 – Chromatogram and UV spectrum of DecaBDE..... | 52 |
| Figure D.9 – Chromatogram and UV spectrum of decaBB..... | 52 |
| Figure D.10 – Chromatogram and UV Spectrum of OctaBDE..... | 52 |
| Figure D.11 – Chromatogram and UV spectrum of octaBB..... | 52 |
| Figure E.1 – Flow chart, example applicability of the IAMS, HPLC and GC-MS test methods | 53 |
| | |
| Table 1 – Matrix spiking solution | 13 |
| Table 2 – Reference masses for the quantification of PBBs | 15 |
| Table 3 – Reference masses for the quantification of PBDEs | 16 |
| Table 4 – Example list of commercially available calibration congeners considered suitable for this analysis..... | 17 |
| Table 5 – Calibration solutions of PBBs and PBDEs | 18 |
| Table 6 – IIS4B threshold judgement..... | 21 |
| Table 7 – IIS4B repeatability and reproducibility | 22 |
| Table 8 – Example calculation..... | 23 |
| Table A.1 – Measurement condition of IAMS | 28 |
| Table A.2 – Example list of commercially available calibrant reference materials considered suitable for this analysis..... | 29 |
| Table A.3 – Example PBDE response factor standards (i.e. BDE-WD (Wellington), solution/ mixture of polybrominated diphenyl ether congeners(PBDE)) | 29 |
| Table A.4 – Calibrant amounts | 30 |
| Table A.5 – Response factor of each PBDE congener ^a | 32 |
| Table A.6 – IIS4B threshold judgement..... | 34 |
| Table A.7 – IIS4B repeatability and reproducibility | 35 |

| | |
|---|----|
| Table C.1 – Example list of commercially available technical calibration mixtures considered suitable for this analysis | 41 |
| Table C.2 – Standard stock solution concentrations (mg/100 ml)..... | 41 |
| Table C.3 – IIS4B threshold judgement | 43 |
| Table C.4 – IIS4B Repeatability and reproducibility..... | 44 |
| Table D.1 – PBB and PBDE congeners in the mixture..... | 46 |
| Table F.1 – Statistical Data for GC-MS..... | 54 |
| Table F.2 – Statistical data for IAMS | 55 |
| Table F.3 – Statistical data for HPLC-UV | 56 |

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DETERMINATION OF CERTAIN SUBSTANCES
IN ELECTROTECHNICAL PRODUCTS –****Part 6: Polybrominated biphenyls and polybrominated diphenyl ethers
in polymers by gas chromatography–mass spectrometry (GC-MS)**

FOREWORD

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International Standard IEC 62321-6 has been prepared by IEC technical committee 111: Environmental standardization for electrical and electronic products and systems.

The first edition of IEC 62321:2008 was a 'stand-alone' standard that included an introduction, an overview of test methods, a mechanical sample preparation as well as various test method clauses.

This first edition of IEC 62321-6 is a partial replacement of IEC 62321:2008, forming a structural revision and generally replacing Annex A.

Future parts in the IEC 62321 series will gradually replace the corresponding clauses in IEC 62321:2008. Until such time as all parts are published, however, IEC 62321:2008 remains valid for those clauses not yet re-published as a separate part.

The text of this standard is based on the following documents:

| | |
|--------------|------------------|
| FDIS | Report on voting |
| 111/368/FDIS | 111/379/RVD |

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

This publication 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 web site 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
- amended.

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INTRODUCTION

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

The use of certain substances (e.g. lead (Pb), cadmium (Cd) and polybrominated diphenyl ethers (PBDE's)) 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.

WARNING – Persons using this International Standard should be familiar with normal laboratory practice. This standard 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 6: Polybrominated biphenyls and polybrominated diphenyl ethers in polymers by gas chromatography–mass spectrometry (GC-MS)

1 Scope

This Part of IEC 62321 specifies one normative and two informative techniques for the determination of polybrominated biphenyls (PBB) and diphenyl ethers (PBDE) in polymers of electrotechnical products.

The gas chromatography–mass spectrometry (GC-MS) test method is suitable for the determination of monobrominated to decabrominated biphenyls (PBB) and monobrominated to decabrominated diphenyl ethers (PBDE).

Annexes A and C contain methods using ion attachment mass spectrometry (IAMS) coupled with direct injection probe (DIP) and high-pressure liquid chromatography coupled to photo diode array ultra violet detector (HPLC-PDA/UV). These techniques have utility as fast, qualitative or semi-quantitative type methods but are subject to limitations including interferences or the number or type of PBB and PBDE compounds within their scope.

The ion attachment mass spectrometry (IAMS) technique is limited to the determination of decabromo biphenyl and technical mixtures of decabromodiphenyl ether, octabromodiphenyl ether, and pentabromo diphenyl ether flame retardant compounds. The determination of other PBBs or PBDEs by this method has not been evaluated.

The high-pressure liquid chromatography technique is limited to the determination of technical mixtures of decabromodiphenyl ether, octabromo diphenyl ether, decabromo biphenyl and octabromo biphenyl technical flame retardants. The determination of other PBBs or PBDEs by this method has not been evaluated.

These test methods have been evaluated for use with PS-HI (polystyrene, high-impact) and PC/ABS (a blend of polycarbonate and acrylonitrile butadiene styrene) containing individual PBDEs between 20 mg/kg to 2 000 mg/kg and total PBDEs between 1 300 mg/kg to 5 000 mg/kg as depicted in this standard including in Annex F. The use of these methods for other polymer types, PBBs or other PBDE compounds or concentration ranges other than those specified above has not been specifically evaluated.

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.

IEC 62321:2008, *Electrotechnical products – Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)*

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