SLOVENSKI STANDARD
SIST EN IEC 62321-3-3:2021

01-december-2021

Določevanje posameznih snovi v elektrotehničnih izdelkih - 3-3. del: Preséjanje polibromiranih bifenilov, polibromiranih difenil etrov in ftalatov v polimerih s pirolizo (Py-GC-MS) ali s termodesorpcijsko plinsko kromatografijo z masno spektrometrijo (TD-GC-MS)

Determination of certain substances in electrotechnical products Part 3-3: Screening of polybrominated biphenyls, polybrominated diphenyl ethers and phthalates in polymers by pyrolysis (Py-GC-MS) or thermal desorption (TD-GC-MS) gas chromatography-mass spectrometry

Ta slovenski standard je istoveten z: **EN IEC 62321-3-3:2021**

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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 IEC 62321-3-3:2021 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62321-3-3

October 2021

ICS 13.020.01; 43.040.10

English Version

Determination of certain substances in electrotechnical products - Part 3-3: Screening - Polybrominated biphenyls, polybrominated diphenyl ethers and phthalates in polymers by gas chromatography-mass spectrometry using a pyrolyser/thermal desorption accessory (Py/TD-GC-MS) (IEC 62321-3-3:2021)

Détermination de certaines substances dans les produits électrotechniques - Partie 3-3: Détection - Diphényles polybromés, diphényléthers polybromés et phtalates dans les polymères par chromatographie en phase gazeuse-spectrométrie de masse par pyrolyse/thermodésorption (Py/TD-GC-MS) (IEC 62321-3-3:2021)

Verfahren zur Bestimmung von bestimmten Substanzen in Produkten der Elektrotechnik - Teil 3-3: Screening der polybromierten Biphenyle, polybromierten Diphenylether und Phthalate in Polymeren durch Pyrolyse (Py-GC-MS) oder Thermodesorption-Gaschromatographie-Massenspektrometrie (TD-GC-MS) (IEC 62321-3-3:2021)

This European Standard was approved by CENELEC on 19 October 2021. CEN and CENELEC 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.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 111/626/FDIS, future edition 1 of IEC 62321-3-3, 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 IEC 62321-3-3:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022–07–19
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024–10–19

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of the International Standard IEC 62321-3-3:2021 was approved by CENELEC as a European Standard without any modification.

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

IEC 62321-1:2013	NOTE Harmonized as EN 62321-1:2013 (not modified)
IEC 62321-2:2013	NOTE Harmonized as EN 62321-2:2014 (not modified)
IEC 62321-8:2017	NOTE Harmonized as EN 62321-8:2017 (not modified)
IEC 62321-3-1:2013	NOTE Harmonized as EN 62321-3-1:2014 (not modified)
IEC 62321-3-2:2020	NOTE Harmonized as EN IEC 62321-3-2:2020[1] (not modified)
IEC 62321:2008[2]	NOTE Harmonized as EN 62321:2009[3] (not modified)
ISO 3696	NOTE Harmonized as EN ISO 3696
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[1] To be published. Stage at time of publication: prEN IEC 62321-3-2:2020.

[2] Withdrawn.

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Determination of certain substances in electrotechnical products – Part 3-3: Screening – Polybrominated biphenyls, polybrominated diphenyl ethers and phthalates in polymers by gas chromatography-mass spectrometry using a pyrolyser/thermal desorption accessory (Py/TD-GC-MS)

Détermination de certaines substances dans les produits électrotechniques – Partie 3-3: Détection – Diphényles polybromés, diphényléthers polybromés et phtalates dans les polymères par chromatographie en phase gazeuse-spectrométrie de masse par pyrolyse/thermodésorption (Py/TD-GC-MS)

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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IEC 62321-3-3 has been prepared by IEC technical committee 111: Environmental standardization for electrical and electronic products and systems. It is an International Standard.

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

FDIS	Report on voting
111/626/FDIS	111/632/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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 document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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 polybrominated biphenyls (PBBs), polybrominated diphenyl ethers (PBDEs) and certain phthalates in electrotechnical products is of concern in many regions of the world.

The purpose of this document is therefore to provide a test method that will allow the electrotechnical industry to determine the levels of polybrominated biphenyls (PBBs), polybrominated diphenyl ethers (PBDEs), 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-isodecyl phthalate (DIDP) in electrotechnical products on a consistent global basis.

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.

DETERMINATION OF CERTAIN SUBSTANCES IN ELECTROTECHNICAL PRODUCTS –

Part 3-3: Screening – Polybrominated biphenyls, polybrominated diphenyl ethers and phthalates in polymers by gas chromatography-mass spectrometry using a pyrolyser/thermal desorption accessory (Py/TD-GC-MS)

1 Scope

This part of IEC 62321 specifies the screening analysis of polybrominated biphenyls (PBBs), polybrominated diphenyl ethers (PBDEs), 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-isodecyl phthalate (DIDP) in polymers of electrotechnical products using the analytical technique of gas chromatography-mass spectrometry using a pyrolyser/thermal desorption accessory (Py/TD-GC-MS).

This test method has been evaluated through the analysis of PP (polypropylene), PS (polystyrene), and PVC (polyvinyl chloride) materials containing deca-BDE between 100 mg/kg and 1 000 mg/kg and individual phthalates between 100 mg/kg to 4 000 mg/kg as depicted in Annex J. Use of the methods described in this document for other polymer types, PBBs (mono-deca), PBDEs (mono-deca) and phthalates or concentration ranges other than those specified above has not been specifically evaluated.

This document has the status of a horizontal standard in accordance with IEC Guide 108 [1][1].

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

1 Numbers in square brackets refer to the bibliography.

3.1.1
reference material
material, sufficiently homogeneous and stable with reference to specified properties, which has been established to be fit for its intended use in measurement or in examination of nominal properties

[SOURCE: IEC 62321-1:2013, 3.1.7 [2]]

3.1.2
screening
analytical procedure to determine the presence or absence of substances in the representative part or section of a product, relative to the value or values chosen as the criterion for presence, absence or further testing

Note 1 to entry: If the screening method produces values that are not conclusive, then additional analysis or other follow-up actions may be necessary to make a final presence/absence decision.

[SOURCE: IEC 62321-1:2013, 3.1.10]

3.1.3
calibrant
calibration standard
substance in solid or liquid form with known and stable concentration(s) of the analyte(s) of interest used to establish instrument response with respect to analyte(s) concentration(s) or mass

3.1.4
response factor
RF
ratio between the mass of the compound being analysed and the peak area of that compound in Equation (1)

$$RF = A / m \quad (1)$$

where

RF is the response factor;

A is the peak area of a compound;

m is the mass of a compound

3.1.5
relative response factor
RRF
ratio between the RFs of two compounds – compound A and compound B – in Equation (2)

$$RRF_{A/B} = RF_A / RF_B \quad (2)$$

where

$RRF_{A/B}$ is the relative response factor of compound A to compound B;

RF_A is the response factor of compound A;

RF_B is the response factor of compound B

3.1.6
substitute compound
compound used to calculate RRFs of each analyte

Note 1 to entry: More than one compound can be selected as a substitute compound. The RRF of the analyte is the ratio of the RF of the analyte to this compound. In Equation (3), compound B corresponds to this. The role is the same as internal standards to correct the response factor. However, this is not included in test samples and is analysed before analysis of test samples. From the RF of the substitute compound and the RRF of the analyte, the RF of each analyte is calculated.

$$RF_A = RRF_{A/B} \times RF_B \quad (3)$$

where

RF_A is the response factor of compound A;

RF_B is the response factor of compound B; substitute compound

3.2 Abbreviated terms

BB-003	4-bromobiphenyl
BB-015	4,4'-dibromobiphenyl
BB-029	2,4,5-tribromobiphenyl
BB-049	2,2',4,5'-tetrabromobiphenyl
BB-103	2,2',4,5',6-pentabromobiphenyl
BB-153	2,2',4,4',5,5'-hexabromobiphenyl
BB-189	2,3,3',4,4',5,5'-heptabromobiphenyl
BB-194	2,2',3,3',4,4',5,5'-octabromobiphenyl
BB-206	2,2',3,3',4,4',5,5',6-nonabromobiphenyl
BB-209	decabromo biphenyl
BBP	benzyl butyl phthalate
BDE-003	4-bromodiphenyl ether
BDE-015	4,4'-dibromodiphenyl ether
BDE-028	2,4,4'-tribromodihenyl ether
BDE-047	2,2',4,4'-tetrabromodiphenyl ether
BDE-099	2,2',4,4',5-pentabromodiphenyl ether
BDE-153	2,2',4,4',5,5'-hexabromodiphenyl ether
BDE-183	2,2',3,4,4',5',6-heptabromodiphenyl ether
BDE-203	2,2',3,4,4',5,5',6-octabromodiphenyl ether
BDE-206	2,2',3,3',4,4',5,5',6-nonabromodiphenyl ether
BDE-209	decabromodiphenyl ether
CRM	certified reference material
DBP	di-n-butyl phthalate
DEHP	di-(2-ethylhexyl) phthalate
DIBP	di-isobutyl phthalate
DIDP	di-isodecyl phthalate
DINP	di-isononyl phthalate
DNOP	di-n-octyl phthalate
EGA	evolved gas analysis
EI	electron ionization