

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

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 62321-6:2015 sisaldab Euroopa standardi EN 62321-6:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 62321-6:2015 consists of the English text of the European standard EN 62321-6:2015.
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## English Version

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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Europäisches Komitee für Elektrotechnische Normung

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

## European foreword

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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](http://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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## 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*