

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

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**Determination of certain substances in electrotechnical products –  
Part 9: Hexabromocyclododecane in polymers by gas chromatography-mass  
spectrometry (GC-MS)**

**Détermination de certaines substances dans les produits électrotechniques –  
Partie 9: Hexabromocyclododécane dans les polymères par chromatographie  
en phase gazeuse-spectrométrie de masse (GC-MS)**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DETERMINATION OF CERTAIN SUBSTANCES  
IN ELECTROTECHNICAL PRODUCTS –**

**Part 9: Hexabromocyclododecane in polymers  
by gas chromatography-mass spectrometry (GC-MS)**

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

FDIS	Report on voting
111/620/FDIS	111/631/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://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](http://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- withdrawn,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 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 (PBDEs) in electrotechnical products is a source of concern in current and proposed regional legislation.

The purpose of this document 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 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 9: Hexabromocyclododecane in polymers by gas chromatography-mass spectrometry (GC-MS)

#### 1 Scope

This part of IEC 62321 specifies two techniques for the determination of hexabromocyclododecane (HBCDD) in polymers of electrotechnical products.

The gas chromatography-mass spectrometry (GC-MS) test method is described in the normative part of this document. The GC-MS method is suitable for the determination of hexabromocyclododecane (HBCDD).

A method using high-pressure liquid chromatography-mass spectrometry (HPLC-MS) is given in informative Annex A.

These test methods have been evaluated for use with EPS (expanded polystyrene foam), XPS (extruded polystyrene foam) and ABS (acrylonitrile butadiene styrene) within the concentration ranges as specified in Table 1. The use of this method for other types of materials or concentration ranges outside those specified below has not been evaluated.

**Table 1 – Tested concentration ranges for HBCDD by GC-MS in various materials**

Substance or element	HBCDD		
Parameter	Unit of measurement mg/kg	Medium or material tested	
		EPS/XPS	ABS
Concentration range tested		6 080 to 11 940	1 000 to 10 000

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

#### 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*

#### 3 Terms, definitions and abbreviated terms

##### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62321-1 apply.

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