
**Textiles — Determination of certain
flame retardants —**

**Part 1:
Brominated flame retardants**

Textiles — Détermination de certains retardateurs de flamme —

Partie 1: Retardateurs de flamme bromés

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 38, *Textiles*.

ISO 17881 consists of the following parts, under the general title *Textiles — Determination of certain flame retardants*:

— *Part 1: Brominated flame retardants*

— *Part 2: Phosphorus flame retardants*

[ISO 17881-1:2016](#)

<https://standards.iso.org/standards/iso/b97e1a5f-af4b-4c80-a9fa-90981e126684/iso-17881-1-2016>

Textiles — Determination of certain flame retardants —

Part 1: Brominated flame retardants

WARNING — This International Standard calls for the use of substances and/or procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage. It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced people.

1 Scope

This part of ISO 17881 specifies a test method for determining some brominated flame retardants in textiles by gas chromatography – mass spectrometry (GC-MS).

The method is applicable to all kinds of textile products.

2 Principle

The flame retardants are extracted from textile specimen by ultrasonic generator with toluene. The flame retardants in the specimen are identified by GC-MS and quantified by using internal standard method.

3 Reagents

Unless otherwise specified, use only reagents of recognized analytical grade.

- 3.1 **Monobromobiphenyl (MonoBB)**, CAS no. 2052-07-5.
- 3.2 **Dibromobiphenyl (DiBB)**, CAS no. 57422-77-2.
- 3.3 **Tribromobiphenyl (TriBB)**, CAS no. 59080-34-1.
- 3.4 **Tetrabromobiphenyl (TetraBB)**, CAS no. 60044-24-8.
- 3.5 **Pentabromo-1,1'-biphenyl (PentaBB)**, CAS no. 59080-39-6.
- 3.6 **Hexabromobiphenyl (HexaBB)**, CAS no. 60044-26-0.
- 3.7 **Heptabromo-1,1'-biphenyl (HeptaBB)**, CAS no. 88700-06-5.
- 3.8 **Octabromobiphenyl (OctaBB)**, CAS no. 67889-00-3.
- 3.9 **Nonabromobiphenyl (NonaBB)**, CAS no. 69278-62-2.
- 3.10 **Decabromobiphenyl (DecaBB)**, CAS no. 13654-09-6.
- 3.11 **Tetrabromodiphenylether (TetraBDE)**, CAS no. 5436-43-1.

- 3.12 **Pentabromodiphenylether (PentaBDE)**, CAS no.32534-81-9.
- 3.13 **Hexabromodiphenylether (HexaBDE)**, CAS no. 207122-15-4.
- 3.14 **Heptabromodiphenylether (HeptaBDE)**, CAS no. 207122-16-5.
- 3.15 **Octabromodiphenylether (OctaBDE)**, CAS no. 337513-72-1.
- 3.16 **Decabromodiphenylether (DecaBDE)**, CAS no. 1163-19-5.
- 3.17 **Hexabromocyclododecane (HBCDD)**, CAS no. 25637-99-4.
- 3.18 **Decachlorobiphenyl**, CAS no.2051-24-3, internal standard (IS).
- 3.19 **Toluene**.

NOTE Since brominated flame retardants have many isomers, this method might not cover all of them. Determination of the isomers of flame retardants in [Clause 3](#) can refer to this method according to the principle.

4 Apparatus

- 4.1 **Gas chromatography – mass spectrometry (GC-MS)**.
- 4.2 **Ultrasonic generator**, with a frequency from 35 kHz to 45 kHz.
- 4.3 **Evaporator device**, with water bath at 50 °C.
- 4.4 **Brown glass vial**, 40 ml with tight closure.
- 4.5 **Flask**, 100 ml.
- 4.6 **Filtration membrane**, 0,45 µm.
- 4.7 **Balance**, an accuracy of 0,1 mg.

5 Procedure

5.1 Preparation of standard solutions

5.1.1 Stock standard solution

Prepare 1 000 µg/ml of stock standard solutions with individual flame retardant ([3.1](#) to [3.17](#)) and internal standard ([3.18](#)) in toluene ([3.19](#)).

Some commercial reference material solutions may be available in a different solvent.

5.1.2 Internal standard solution

Prepare 10 µg/ml standard solution of decachlorobiphenyl in toluene.