
**Textiles and textile products —
Determination of organotin
compounds —**

**Part 2:
Direct method using liquid
chromatography**

*Textiles et produits textiles — Détermination des composés
organostanniques —*

Partie 2: Méthode directe utilisant la chromatographie en phase liquide

ISO 22744-2:2020

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Published in Switzerland

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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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This document was prepared by Technical Committee ISO/TC 38, *Textiles*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 248, *Textiles and textile products*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 22744 series can be found on the ISO website.

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Textiles and textile products — Determination of organotin compounds —

Part 2: Direct method using liquid chromatography

WARNING — The use of this document involves hazardous materials. It does not purport to address all of the safety or environmental problems associated with its use. It is the responsibility of users of this document to take appropriate measures to ensure the safety and health of personnel and the environment prior to application of the document.

1 Scope

This document specifies a test method for the qualification and quantification of organotin compounds. This test method is applicable to all types of materials of textile products.

NOTE CEN/TR 16741 defines which materials are applicable to this determination.

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.

ISO 4787, *Laboratory glassware — Volumetric instruments — Methods for testing of capacity and for use*

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

4 Principle

The organotin compounds are extracted from the material of a textile product with a methanol-ethanol mixture using tropolone as a complexing agent. The mono- and di-organotin-tropolone complexes and tri-organotin cations formed in the extraction procedure are directly analysed by a liquid chromatograph with a tandem mass spectrometer (LC-MS/MS). This method does not require additional derivatization step.

[Table 1](#) indicates the list of organotin compounds which can be analysed with this document.

This document is also applicable for further organotin compounds provided that the method is validated with the additional compounds.

Table 1 — List of organotin compounds that can be analysed and internal standards

Type of compound	Compound	CAS ^a number
Monosubstituted	Internal standard: n-Heptyltin trichloride	59344-47-7
	n-Butyltin trichloride	1118-46-3
	n-Octyltin trichloride	3091-25-6
	Phenyltin trichloride	1124-19-2
Disubstituted	Internal standard: Di-n-heptyltin dichloride	74340-12-8
	Di-n-butyltin dichloride	683-18-1
	Di-n-octyltin dichloride	3542-36-7
	Diphenyltin dichloride	1135-99-5
Trisubstituted	Internal standard: Tri-n-propyltin chloride	2279-76-7
	Tri-n-butyltin chloride ^b	1461-22-9
	Tri-n-octyltin chloride	2587-76-0
	Triphenyltin chloride (or fentin chloride)	639-58-7
	Tricyclohexyltin chloride	3091-32-5
^a Chemical Abstract Service.		
^b If bis(tri-n-butyltin)oxide (TBTÖ), CAS number 56-35-9, is present, it is detected as tri-n-butyltin.		

5 Reagents

Unless otherwise specified, analytical grade chemicals, especially relevant for liquid chromatography (5.1 to 5.5) shall be used.

5.1 Water.

5.2 Methanol.

5.3 Ethanol.

5.4 Ammonium formate.

5.5 Formic acid.

5.6 Tropolone (2-hydroxy-2,4,6-cycloheptatrien-1-one), CAS number: 533-75-5.

5.7 Organotin compounds, listed in Table 1.

6 Apparatus and materials

The usual equipment and laboratory glassware, according to ISO 4787, shall be used, in addition to the following.

6.1 Analytical balance, with resolution of 0,1 mg.

6.2 Glass vessel, with screw cap, e.g. 40 ml.

6.3 Ultrasonic water bath, with adjustable temperature suitable for operation at about 60 °C.