
**Footwear — Critical substances
potentially present in footwear and
footwear components — Determination of
phthalates in footwear materials**

*Chaussures — Substances critiques potentiellement présentes dans les
chaussures et les composants des chaussures — Détermination des
phthalates dans les matériaux des chaussures*



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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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

ISO/TS 16181 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 309, *Footwear*, in collaboration with Technical Committee ISO/TC 216, *Footwear*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Introduction

Phthalates are commonly used as plasticizers in polymers. Toxicological concern has arisen due to their potential effect as endocrine disruptors and some of the listed phthalates are toxic in reproduction. The level of media publicity will ensure that their use continues to be of concern to consumers.

Phthalates are controversial because high doses of many phthalates have shown hormonal activity in rodent studies. Studies on rodents involving large amounts of phthalates have shown damage to the liver, the kidneys, the lungs, and the developing testes.

This Technical Specification calls for the use of substances and/or procedures that can be injurious to health if appropriate precautions are not observed. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

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SAFETY PRECAUTIONS — Persons using this Technical Specification should be familiar with normal laboratory practice. This Technical Specification does not claim 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.

IMPORTANT — It is absolutely essential that tests conducted according to this Technical Specification be carried out by suitably trained staff.

1 Scope

This Technical Specification specifies a test method to determine the presence of phthalate compounds. This test method is applicable to all types of footwear materials.

NOTE 1 This test method can also be used to determine plasticizers other than those listed in 3.2, subject to validation.

NOTE 2 ISO/TR 16178 defines which materials are concerned by this determination.

2 Principle

The aim of the method is to extract phthalates in footwear materials such as leather, textile, polymer, coated materials or others. This method uses extraction apparatus with *n*-hexane/acetone as solvent.

The total *n*-hexane/acetone extractable phthalate plasticizer content is calculated by weight with gas chromatography-mass spectrometry (GC-MS) detection to identify and quantify individual phthalates.

3 Apparatus and reagents

3.1 Apparatus

- 3.1.1 Scales, resolution of 1 mg.
- 3.1.2 Flask, 50 ml.
- 3.1.3 Water-cooled condenser.
- 3.1.4 Spark-proof heating mantle/water bath.
- 3.1.5 Ultrasonic bath.
- 3.1.6 Microwave extractor.
- 3.1.7 Steam bath or rotary evaporator.