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**Footwear — Critical substances  
potentially present in footwear and  
footwear components — Test method  
to quantitatively determine dimethyl  
fumarate (DMFU) in footwear materials**

*Chaussure — Substances critiques potentiellement présentes dans  
la chaussure et les composants de chaussure — Méthodes d'essai  
pour déterminer quantitativement le diméthylfumarate (DMFu) dans les  
matériaux de chaussure*



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ISO/TS 16186 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 309, *Footwear*, in collaboration with ISO Technical Committee TC 216, *Footwear*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).



# Footwear — Critical substances potentially present in footwear and footwear components — Test method to quantitatively determine dimethyl fumarate (DMFU) in footwear materials

## 1 Scope

This Technical Specification gives a test method for determining the amounts of dimethyl fumarate (DMFU) in footwear materials, desiccant sachets and other commodities.

The test method is not applicable to metal parts. The materials to which it is applicable are given in ISO/TR 16178:2012, Table 1.

**NOTE** In Europe, DMFU is prohibited in biocidal products as per Directive 98/8/EC. The substance must be used with caution to avoid any health problems in the chemistry laboratory. More recently, EU Commission Decision 2009/251/EC requires EU member states to ensure that products containing the biocide DMFU are not placed or made available on the market in the European Union. Decision 2009/251/EC establishes a maximum concentration of DMFU in products and parts of products of 0,1 mg/kg.

## 2 Normative references

The following referenced documents are indispensable for the application 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*

ISO/TR 16178:2012, *Footwear — Critical substances potentially present in footwear and footwear components*

## 3 Principle of method

The sample is cut into small pieces and extracted with acetone in a sealed vial at a defined temperature in an ultrasonic bath. At this step, two different procedures are proposed, to be used depending on the material being tested:

- a) the first procedure, without purification and concentration of the extracted solution, can be used for samples giving a simple chromatograph, for example, textiles;
- b) the second procedure, with purification and concentration of the extract, can be used for samples with a complex matrix effect, such as leather.

## 4 Reagents

### 4.1 General

The substances given in Table 1 shall be used at a defined purity grade (at least 99,5 %).