
**Footwear — Critical substances
potentially present in footwear
and footwear components — Test
method to quantitatively determine
dimethylformamide in footwear
materials**

*Chaussures — Substances critiques potentiellement présentes dans
la chaussure et les composants de chaussure — Méthodes d'essai
pour déterminer quantitativement le diméthylformamide dans les
matériaux de chaussure*



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Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Method principle	1
4 Reagents and solvents	1
4.1 Reagents.....	1
4.2 Stock solutions.....	1
5 Equipment	2
6 Preparation of sample	2
6.1 Sampling.....	2
6.2 Extraction.....	2
7 Determination with GC-MS	3
7.1 Calibration standard.....	3
7.2 Examples of instrumental method.....	3
8 Quantification	3
8.1 Calibration curve.....	3
9 Performance of the method	4
10 Test report	4
Annex A (informative) Suggested parameters for GC-MS determination of DMFo	5
Bibliography	6

Foreword

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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 normative 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order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn.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again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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ISO/TS 16189 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 309, *Footwear*, in collaboration with ISO Technical Committee ISO/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 dimethylformamide in footwear materials

1 Scope

This Technical Specification specifies a method to determine the amounts of dimethylformamide (DMFo) in footwear and footwear components containing polyurethane (PU) coated material.

NOTE In the footwear industry, when PU is injected (reaction moulded), this process does not require the use of DMFo. DMFo can be used for PU coated material.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

3 Method principle

The sample is cut into small pieces and extracted with methanol in a sealed vial at 70 °C in an ultrasonic bath. An aliquot of the extract is analysed with GC-MS in SIM mode.

ISO/TR 16178:2012, Table 1 defines which materials are concerned by this determination.

4 Reagents and solvents

4.1 Reagents

The substances are given in [Table 1](#).

Table 1 — Reagents

Number	Substances	CAS Number ^a	Purity
1	Dimethylformamide (DMFo)	68-12-2	Certificated standard
2	Dimethylformamide-d7 (DMFo-d7)	4472-41-7	Certificated standard
3	Methanol	67-56-1	Analytical grade

^a CAS: Chemical Abstract Service.

4.2 Stock solutions

4.2.1 Internal standard — Stock solution (1 000 mg/l)

10 mg of DMFo-d7 is weighted with an accuracy of 0,1 mg in a 10 ml volumetric flask and filled up to the mark with methanol. The content is further transferred in an amber 10 ml vial with PTFE stopcock and kept at 4 °C.