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# Footwear — Chemical tests — General principles on the preparation of samples

*Chaussures — Essais chimiques — Principes généraux relatifs à la préparation des échantillons*



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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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# Foreword

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



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# Introduction

With the development of society and the improvement of people's living standards, the chemical safety of footwear has widely gained attention. As more critical substance in footwear and footwear components are needed, many chemical test methods for critical substances have been developed.

However, there lacks a unified sample preparation method for chemical tests. Due to the complex materials and structures used in footwear and the different ways in which critical substances exist, the sample taken from footwear is often not sufficiently homogeneous to give a representative test specimen. It is thus very difficult to develop a single technique of sampling that can be used in all circumstances. However, if every material in an article of footwear were tested, it would be a large amount of work and yield a large test fee. As an example, see Table 1, a common article of footwear can cut into over 10 kinds of test specimen when carrying out tests for one chemical. So, a sampling method is needed urgently to provide general rules for preparation of samples, which can reduce and even prevent the inconsistency of sampling procedures between different laboratories and which can provide a guarantee for the stability of test results.

# Footwear — Chemical tests — General principles on the preparation of samples

## 1 Scope

This document specifies a range of procedures for the sample preparation of footwear and footwear components to carry out chemical tests. It further specifies how to designate the samples.

The sampling procedures specified are designed to allow concurrent chemical testing for footwear

This document is applicable to all types of footwear and footwear components.

## 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 4044, *Leather — Chemical tests — Preparation of chemical test samples*

ISO 19952, *Footwear — Vocabulary*



## 3 Terms and definitions



For the purposes of this document, the terms and definitions given in ISO 19952 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

**3.1**
**component in contact with the skin**
component closely in contact with foot or leg skin during wearing

Note 1 to entry: Foot (leg) skin hose includes sock, stocking, tights, etc.

Note 2 to entry: If a footwear has no lining, the inside of upper should be taken as lining and regarded as component in contact with the skin.

EXAMPLE Linings, tongues, insoles and insocks are components in contact with the skin.

**3.2**
**accessory**
indispensable visible component that has a technical function in the footwear construction

EXAMPLE Fasteners, zipper, laces.

**3.3**
**decorative attachment**
component with no functional property and usually designed for aesthetic purpose

Note 1 to entry: See Figure 1.

**Figure 1 — Example of decorative attachment**

**3.4**
**accessible component**
component that could be directly reached or touched without dismantling or destroying any permanent joining of the footwear

**3.5**
**inaccessible component**
component hidden inside the footwear that cannot be reached or touched without dismantling or destroying any permanent joining of the footwear

EXAMPLE Foam, shank, toe puff, stiffener, etc.

**3.6**
**combined material**
**composite material**
material constituted of a combination of several different raw materials which cannot be separated mechanically



EXAMPLE Coated textile/leather (a textile/leather covered by a polymer film), complex upper (upper and lining are fully stuck by glue or other techniques and it is impossible to separate them), rubber boot upper (the sock is fully dissolved in rubber), soling material (in injected sole footwear the insole can be fully dissolved in the sole), foam with adhesive or foam with residues of adhesive, etc.

**3.7**
**composite test sample**
mixture of several different test samples of the footwear from the same material classification

**3.8**
**sample**
raw, semi-worked, worked, semi-manufactured, manufactured, semi-made-up or made-up product

## 4 Designation system

### 4.1 General

For each sample, the following parameters shall be specified:

— component parts;

— colours;

— material classifications;

— any other useful information.

Table 1 gives examples of sample designation.

## 4.2 Component part designation

Figure 2 defines the different components of the footwear. Figure 2 shall be used to identify the components present in the tested footwear (see ISO 19952 for definitions to components listed).

If needed, position terms can be used to further specify the designation of the part. Figures 3 and 4 can be used as reference.

There are four main positions viewing from above: front, back, lateral and medial. For parts in between, there are four more sub-positions (see Figure 3). There are two main positions viewing form lateral: top and lower. For parts in between, there are 4 more sub-positions (see Figure 4).

If the decorative attachments cover more than 50 % of the upper area, as shown in Figure 1, consider the decorative attachment as an upper.

## 4.3 Colour designation

The colour of test samples shall be determined according to the colour designation given in Annex A.

## 4.4 Material classification designation

Specify the material classification of each test sample. The material classification of each test sample shall be in accordance with Annex C. For example, leather and fur, textile, polymer (including synthetic materials, plastic etc.), rubber, foam, wood, metal and fibrous board, etc.

In certain cases, it is difficult for laboratories to easily identify the material of the component, for example:



— Rubber, PU, plastic, foam should be termed as polymers.

— Natural and synthetic fibres should be termed as textiles.



NOTE The material classification can be completed by additional information:

— Leather can be further classified into bovine, sheep, goat, coated bovine, bovine suede, split bovine, etc.

— Textile can be further classified into cotton, silk, polyamide, polyester, fibre blending, etc.

## 4.5 Useful information designation

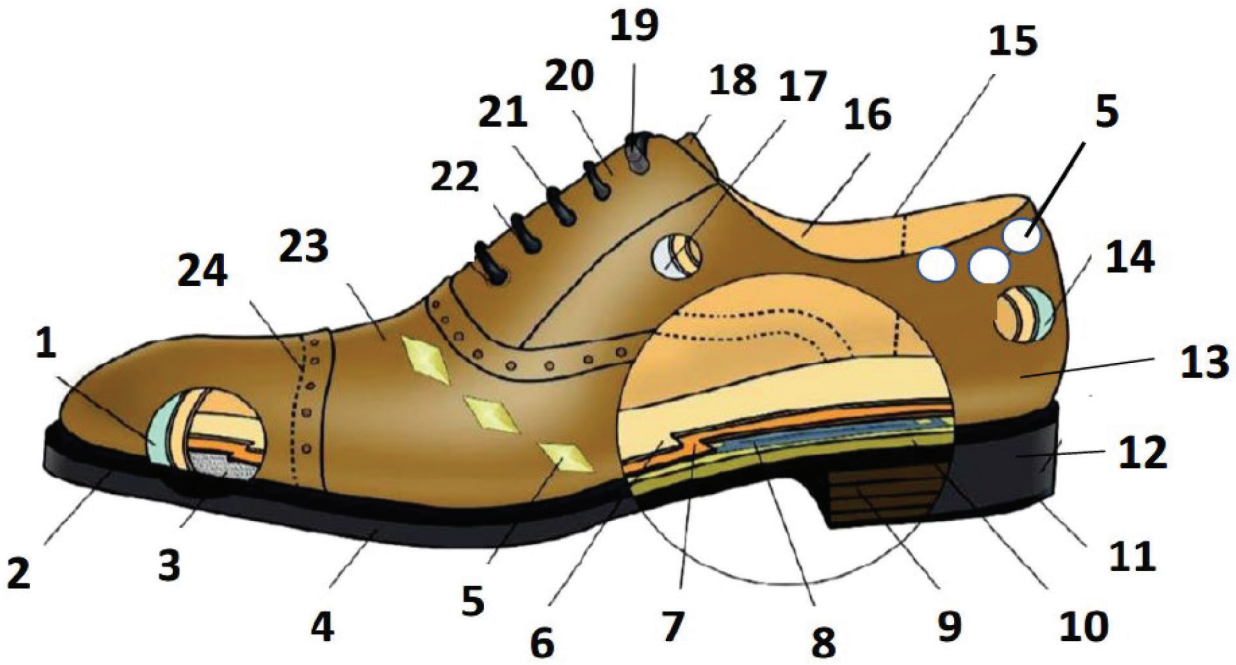
For test samples, the information below shall be specified:

— component in contact with the skin or component not in contact with the skin;

— accessory;

— if the component is covered by glue(s);

— accessible component or inaccessible component.




**Key**

| | | | | | |
|---|---|---|---|---|---|
| 1 | toe puff | 9 | heel lift | 17 | interlining |
| 2 | welt | 10 | midsole | 18 | tongue |
| 3 | bottom filling | 11 | top piece | 19 | lace hook |
| 4 | outsole | 12 | heel | 20 | facer |
| 5 | decorative attachment | 13 | quarter | 21 | lace |
| 6 | insock | 14 | stiffener | 22 | eyelet |
| 7 | insole | 15 | collar | 23 | vamp |
| 8 | shank | 16 | lining | 24 | seam |



**Figure 2 — Components of footwear**

**Table 1 — Example of sample designation**

| Test samples | Component part | Colour | Material classification | Useful information |
|---|---|---|---|---|
| 1 | Vamp (upper) | Black | Coated leather | |
| 2 | Quarter (upper) | Black | Polyurethane (PU) coated textile | Polyvinyl chloride (PVC) pre-test: negative |
| 3 | Counter (upper) | Dark grey | PU coated textile | PVC pre-test: negative |
| 4 | Quarter (lining) | Light orange | Natural textile | component in contact with the skin |
| 5 | Counter (lining) | Light orange | Natural textile | component in contact with the skin |
| 6 | Counter (lining) | Light brown | Synthetic textile [b] | component in contact with the skin |
| 7 | Toe puff | Dark yellow | Polymer [a] | |
| 8 | Stiffener | Light grey | Polymer [a] | |
| 9 | Vamp (lining) | Brown | Leather | component in contact with the skin |
| 10 | Insock | Brown | Leather | component in contact with the skin |
| 11 | Back lower cushion | Grey | Foam | PVC pre-test: negative |
| 12 | Insole | Brown | combined material | |
| 13 | Shank | Light grey | Metal | Steel |
| 14 | Wedge | Dark grey | Cellulosic material | Paper board |
| 15 | Midsole | Grey | PU | PVC pre-test: negative |
| 16 | Heel | Light grey | PU | PVC pre-test: negative |
| 17 | Top piece | Black | Rubber | |
| 18 | Outsole | Black | Rubber | |
| 19 | Facer | White | Textile [c] | |
| 20 | Decorative attachment, front lateral | Light yellow | Metal | Brass |
| 21 | Decorative attachment, back | Light yellow | Metal | through rivet Stainless steel |

It is possible that a component is constituted of several materials.

In certain cases, it is impossible to specify clearly the material classification. Therefore, a generic term may be used:

[a] Covers all types of polymers excluding synthetic textiles, foams and rubber.

[b] All textiles excluding all natural base fibre.

[c] Covers all types of textile material.