
**Textiles — Determination of
deodorant property —**

**Part 3:
Gas chromatography method**

Textiles — Détermination des propriétés de neutralisation d'odeurs —

Partie 3: Méthode par chromatographie en phase gazeuse

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ISO 17299-3:2014

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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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 38, *Textiles*.

ISO 17299 consists of the following parts, under the general title *Textiles — Determination of deodorant property*:

- *Part 1: General principle*
- *Part 2: Detector tube method*
- *Part 3: Gas chromatography method*
- *Part 4: Condensation sampling analysis*
- *Part 5: Metal-oxide semiconductor sensors method*

Introduction

This part of ISO 17299 describes a gas chromatography testing method for concentration measurement of odour chemicals in deodorant testing. This is the most general testing method that could be carried out in many testing laboratories globally if they have gas chromatography.

To avoid duplication, the major stream of the testing procedure is described in ISO 17299-1. This part of ISO 17299 describes a specific procedure for the gas chromatography testing method.

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Textiles — Determination of deodorant property —

Part 3: Gas chromatography method

1 Scope

This part of ISO 17299 specifies a gas chromatography test method for the deodorant testing of all textile products. This method applies to the odour component chemicals, such as indole, isovaleric acid, nonenal, and acetic acid with added sodium chloride (NaCl). Two preparation methods are described in this test method:

- an odour chemical is applied in a container avoiding contact with a specimen in method A. Each chemical is tested separately;
- an odour chemical is injected directly on to the specimen in a container in method B. The chemicals tested in this method are a mixture of acetic acid and sodium chloride (NaCl).

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 139, *Textiles — Standard atmospheres for conditioning and testing* 4455-

93b8-56665406230f/iso-17299-3-2014

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

3 Principle

Concentration of the gaseous odour component chemicals of the gas in containers with or without a test specimen after a designated contacting time is measured by gas chromatography (GC). The reduction rate of concentration of odour chemicals in the container is calculated from the concentration data with a specimen and without a specimen.

4 Reagents

Unless otherwise specified, analytical grades shall be used.

- 4.1 Acetic acid (CH₃COOH)**, reagent with a purity of 99,7 %.
- 4.2 Indole (C₈H₇N)**, reagent.
- 4.3 Isovaleric acid**, reagent with a purity of 98,0 %.
- 4.4 2-Nonenal (C₉H₁₆O)**, reagent with a purity of 95,0 %.
- 4.5 Diluent gas**, nitrogen gas from a nitrogen gas cylinder with a purity of at least 99,99 %.
- 4.6 NaCl**, reagent grade.
- 4.7 Ethanol**, reagent grade.
- 4.8 Water**, grade 3 of ISO 3696.

5 Materials and apparatus

- 5.1 **Conical flask**, with a capacity of 500 ml, made of glass.
- 5.2 **Sealing film**, capable of expanding with no air permeability [e.g. Parafilm¹⁾].
- 5.3 **Injection vial**, with a capacity of 22 ml, with a rubber stopper and aluminium cap.
- 5.4 **Injection syringe**, capable of injecting at 8 µl and 850 µl in volume.
- 5.5 **Gastight syringe**.
- 5.6 **Heating oven**, capable of heating at 80 °C ± 2 °C for 30 min.
- 5.7 **Gas chromatography (GC) apparatus**, with a flame ionization detector (FID) or mass selective detector (MSD).
- 5.8 **Rubber stopper and aluminium cap**.

6 Testing environment

The testing environment used in this test is a room temperature of 20 °C and a relative humidity of 65 % in accordance with ISO 139.

7 Test procedure

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7.1 General

Two preparation methods are described in this clause as method A and method B. One method shall be selected with the consent of the concerned parties.

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7.2 Preparation of specimen

The dimension or mass of specimen for the textile products is shown in [Table 1](#).

Table 1 — Dimension or mass of specimen

Kind of specimen	Dimension or mass of specimen	
	Method A	Method B
Fabrics (woven, knit, nonwoven, and tapes)	50 cm ² ± 2,5 cm ²	25 cm ² ± 1,25 cm ²
Yarns, fibres, and feather	0,5 g ± 0,025 g	—

NOTE In the case of multi-layer products, the edge and non-treated layer (or not concerned layer) can be covered with aluminium sheets to avoid contact with the odorous atmosphere, or the product can be folded in two with the layer that is not concerned inside, in method A.

7.3 Method A

7.3.1 Prepare six conical flasks (5.1) with 500 ml: three conical flasks are used for testing with a specimen and three conical flasks are used for testing without a specimen as a control test.

7.3.2 Clean the flasks by using nitrogen gas or clean air more than five times of volume of the flask.

1) Parafilm is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

7.3.3 Preparation of the odour component chemical solution.

The test is performed for each odour component chemical independently.

Prepare the odour component chemical solutions for the test separately as the following.

7.3.3.1 Indole

Dissolve 20 g of the indole reagent (4.2) into 1 l of ethanol (4.7).

7.3.3.2 Isovaleric acid

Dissolve 20 g of isovaleric acid reagent (4.3) into 1 l of ethanol (4.7).

7.3.3.3 Nonenal

Dissolve 10 g of nonenal reagent (4.4) into 1 l of ethanol (4.7).

7.3.4 Testing with specimen

7.3.4.1 Preparation of specimen

Take three specimens from the sample for one chemical test as shown in [Table 1](#).

7.3.4.2 Placement of specimen

Put each specimen in a conical flask (5.1) to lie flat on the bottom.

7.3.4.3 Nitrogen purge

Purge the air of the conical flask by blowing of 1 000 ml of nitrogen gas.

Seal the mouth of the conical flask by using sealing film (5.2).

7.3.4.4 Insertion of testing odour component chemical solution

Take 5 µl of the odour component chemical solution prepared in [7.3.3.1](#), [7.3.3.2](#), or [7.3.3.3](#), by using the injection syringe (5.4) through the sealing film and inject the testing solution into the conical flask at the bottom edge of the conical flask, avoiding contact with the specimen.

7.3.4.5 Sealing of the microsyringe hole

Seal the hole of the microsyringe by the sealing film (5.2) over the original seal.

7.3.4.6 Contacting time

Keep the conical flask still for 2 h, without agitation or stirring of the testing gas.

7.3.5 Testing without specimen

For testing without a specimen, repeat the procedure from [7.3.4.2](#) to [7.3.4.6](#) without a specimen.

7.3.6 Sampling of the testing gas

7.3.6.1 After 2 h of contacting time, hold the mouth part of the conical flask and shake approximately 20 times for 20 s vigorously for both flasks of testing gases with and without a specimen.

7.3.6.2 Insert a gastight syringe (5.5) vertically into the centre of the sealing film of the mouth of the conical flask and insert the needle by approximately 4 cm inside the conical flask.