
**Textiles — Determination of
deodorant property —
Part 5:
Metal-oxide semiconductor sensor
method**

Textiles — Détermination de la propriété de déodorant —

Partie 5: Méthode par capteur à semi-conducteur métal-oxyde

Sample Document

get full document from standards.iteh.ai



Reference number
ISO 17299-5:2014(E)

© ISO 2014

Sample Document

get full document from standards.iteh.ai



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	2
5 Reagents	2
6 Apparatus and materials	3
7 Preparation of the odour test gas	3
7.1 Master gas.....	3
7.2 Preparation of the test quasi unpleasant odours.....	4
8 Sensor response check	5
9 Preparation of calibration curve	5
9.1 Initial concentration.....	5
9.2 Odour unit concentration for quasi unpleasant odours.....	5
9.3 Creation of calibration curve for quasi unpleasant odours.....	6
10 Deodorant test	7
10.1 Preparation of test specimen.....	7
10.2 Conditioning of the specimen.....	7
10.3 Test procedure.....	7
11 Calculation of the odour unit concentration	8
12 Calculation of reduction rate	8
13 Test report	9
Annex A (informative) Example of the test	10
Annex B (informative) Specifications of the odour test instrument	14
Annex C (informative) Practical testing results	17
Bibliography	26

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 sensor method*

Introduction

This part of ISO 17299 describes a test method using a testing instrument equipped with multiple metal-oxide semiconductor sensors against composite odours for all textiles. The multiple sensors improve accuracy for several kinds of composite odours.

Sample Document

get full document from standards.iteh.ai

Sample Document

get full document from standards.iteh.ai

Textiles — Determination of deodorant property —

Part 5:

Metal-oxide semiconductor sensor method

1 Scope

This part of ISO 17299 specifies a deodorant test method using an odour analyser equipped with multiple metal-oxide semiconductor sensors against composite odours. The artificial composite odours used in this part of ISO 17299 are a quasi sweat odour, a quasi body odour (nonenal mixture odour) and a quasi excrement odour.

This part of ISO 17299 applies to all kinds of textile products, such as woven fabrics, knits, threads, yarns, fibres, braids, cords, etc.

2 Normative references

ISO 17299-1, *Textiles — Determination of deodorant property — Part 1: General principle*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

quasi unpleasant odour

artificial composite odour used to simulate an unpleasant odour

Note 1 to entry: Artificial composite odours for the purpose of this part of ISO 17299 are as follows:

- quasi sweat odour: ammonia, acetic acid, isovaleric acid;
- quasi body odour (nonenal mixture odour): ammonia, acetic acid, isovaleric acid, nonenal;
- quasi excrement odour: ammonia, acetic acid, hydrogen sulfide, methyl mercaptan, indole.

3.2

odour unit concentration

concentration defined as the rate of the odour chemical concentration in $\mu\text{l/l}$ against the olfactory threshold concentration

Note 1 to entry: It is expressed in OU/m³.

3.3

olfactory threshold concentration

minimum concentration at which human could perceive

Note 1 to entry: Olfactory threshold concentration value of the odour chemical substances used in this part of ISO 17299 is shown in [Table 1](#).

Note 2 to entry: See Reference [1] in the Bibliography.

Table 1 — Olfactory threshold concentration

Unpleasant odour components	Ammonia	Acetic acid	Isovaleric acid	Nonenal	Hydrogen sulfide	Methyl mercaptan	Indole
Olfactory threshold concentration [$\mu\text{l/l}$]	1,5	0,006	0,000 078	0,000 08	0,000 41	0,000 07	0,000 3

3.4 metal-oxide semiconductor sensor

sensor using a metal-oxide semiconductor made of e.g. tin dioxide

Note 1 to entry: The response of sensors corresponds to gas chemical concentration. The blend recipe of the constituent metal-oxide gives different response trend to chemicals.

3.5 odour test instrument

instrument equipped with multiple metal-oxide semiconductor sensors

Note 1 to entry: This instrument is built up with the inlet of the testing gas, sensors, and cleaning system of sensor head.

3.6 response value

value obtained as outputs from sensors

3.7 response vector

vector for a quasi unpleasant odour consisting of response value obtained from each sensor separately

3.8 response vector length

length obtained as vector sum which is calculated as square-root of sum of squares of response values

Note 1 to entry: The length represents a proportional amount of chemical concentration.

3.9 calibration curve

curve that determines odour unit concentration corresponding to response vector length

Note 1 to entry: The quadratic curve is used for this calibration curve derived from Reference [2] as proximity.

4 Principle

The quasi unpleasant odour gas is inserted in plastic bags with test specimen or without specimen. After 2 h reaction time, the odour unit concentration of remained gases is obtained by using an odour test instrument with 10 metal-oxide semiconductor sensors. The reduction rate in odour chemical concentration is calculated from the odour unit concentration with and without specimen.

5 Reagents

Unless otherwise specified, analytical grade reagents shall be used in this test.

5.1 Ammonia water, reagent of 28 % in concentration of ammonia (NH_3) in water.

5.2 Acetic acid, reagent of 99,7 % in concentration of acetic acid (CH_3COOH) in water.

5.3 Methyl mercaptan, 100 $\mu\text{l/l}$ in concentration of standard gas by nitrogen dilution.

5.4 Hydrogen sulfide, 100 $\mu\text{l/l}$ in concentration of standard gas by nitrogen dilution.

- 5.5 **Indole**, indole (C_8H_7N) reagent.
- 5.6 **Isovaleric acid**, 98,0 % solution.
- 5.7 **Nonenal**, 2-nonenal ($C_9H_{16}O$) reagent (95,0 % solution).
- 5.8 **Diluent gas**, dry air obtained from nitrogen - oxygen mixture cylinder with purity of at least 99,999 9 % or, nitrogen gas from nitrogen gas cylinder with purity of at least 99,999 9 %.

6 Apparatus and materials

Unless otherwise specified, the following shall be used in this test.

- 6.1 **Plastic bag**, 3 l in capacity with a glass tube as inlet of gas.
- 6.2 **Air pump**, with a flow meter or an integrating flow meter for 3 l/min flow rate.
- 6.3 **Oven**, capable of operating at 80 °C.
- 6.4 **Micro-syringe**, with a capacity of 10 µl.
- 6.5 **Syringe**, with a capacity of 200 ml.
- 6.6 **Detector tube**, with a concentration measurement range of 50 µl/l to 500 µl/l for ammonia.
- 6.7 **Heat seal**, capable of sealing a plastic bag.
- 6.8 **Aspirator or vacuum pump**.
- 6.9 **Odour test instrument**, with 10 metal-oxide semiconductor sensors.

7 Preparation of the odour test gas

The odour test gases are prepared just before the test. Master gases and the quasi unpleasant odours may be prepared by permeator or gas cylinder.

7.1 Master gas

7.1.1 Clean 3 l of plastic bags (6.1) by using the diluent gas, then the preparation of master gases of odour component chemicals is as described in 7.1.2 to 7.1.4.

7.1.2 Ammonia, acetic acid, isovaleric acid, and nonenal

7.1.2.1 Inject 2,5 l of the diluent gas into the plastic bags (7.1.1).

7.1.2.2 Inject the chemical solution with the amount according to Table 2 into plastic bags prepared in 7.1.2.1.

7.1.2.3 Keep the plastic bags with the prepared gas under the test environment for 30 min.

7.1.3 Hydrogen sulfide and methyl mercaptan

7.1.3.1 Inject the chemical standard gases with the amount according to Table 2 into plastic bags.

7.1.4 Indole

7.1.4.1 Put the specified amount of indole powder into a plastic bag (6.1) according to Table 2.

7.1.4.2 Inject 2,5 l of dilute gas in the plastic bag.

7.1.4.3 Heat the plastic bag for sublimation at 80 °C for 10 min.