
Notranji zrak - 3. del: Določanje formaldehida in drugih karbonilnih spojin v notranjem zraku in zraku v preskusnih komorah - Metoda aktivnega vzorčenja

Indoor air - Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air - Active sampling method

Air intérieur - Partie 3: Dosage du formaldéhyde et d'autres composés carbonylés dans l'air intérieur et dans l'air des chambres d'essai - Méthode par échantillonnage actif

Ta slovenski standard je istoveten z: ISO/FDIS 16000-3

ICS:

13.040.20 Kakovost okoljskega zraka Ambient atmospheres

oSIST ISO/FDIS 16000-3:2026

en,fr,de

Sample Document

get full document from standards.iteh.ai



FINAL DRAFT

International Standard

ISO/FDIS 16000-3

Indoor air —

Part 3:

Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air — Active sampling method

Air intérieur —

*Partie 3: Dosage du formaldéhyde et d'autres composés
carbonylés dans l'air intérieur et dans l'air des chambres d'essai
— Méthode par échantillonnage actif*

ISO/TC 146/SC 6

Secretariat: DIN

Voting begins on:
2026-06-10

Voting terminates on:
2026-08-05

get full document from standards.iteh.ai

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

ISO/FDIS 16000-3:2026(en)

Sample Document

get full document from standards.iteh.ai



COPYRIGHT PROTECTED DOCUMENT

© ISO 2026

All rights reserved. Unless otherwise specified, or required in the context of its implementation, 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
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2026 – All rights reserved

ISO/FDIS 16000-3:2026(en)

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Principle	2
5 Limitations and interferences	2
5.1 General	2
5.2 Ozone interference	3
6 Safety measures	4
7 Apparatus	5
7.1 Sampling	5
7.2 Sample preparation	5
7.3 Sample analysis	6
8 Reagents and materials	7
9 Preparation of reagents and cartridges	7
9.1 Purification of 2,4-dinitrophenylhydrazine	7
9.2 Preparation of DNPH formaldehyde derivative	8
9.3 Preparation of DNPH formaldehyde standards	8
9.4 Preparation of DNPH coated silica gel cartridges	9
9.4.1 General	9
9.4.2 DNPH coating solution	9
9.4.3 Coating of silica gel cartridges	9
10 Procedure	10
10.1 Sample collection	10
10.2 Process blanks	11
10.3 Sample analysis	12
10.3.1 Sample preparation	12
10.3.2 Sample desorption	12
10.3.3 HPLC calibration	12
10.3.4 HPLC analysis for formaldehyde	15
10.3.5 HPLC analysis of other aldehydes and ketones	17
11 Calculations	19
12 Performance criteria and quality assurance	20
12.1 General	20
12.2 Standard operating procedures (SOPs)	20
12.3 HPLC system performance	20
12.4 Sample loss	21
12.5 Measurement plan	21
13 Precision and uncertainty	21
14 Test report	21
Annex A (informative) Determination of acrolein	23
Annex B (informative) Melting points of DNPH carbonyl derivatives	26
Annex C (informative) Precision and uncertainty	27
Bibliography	29

ISO/FDIS 16000-3:2026(en)

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement. For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 6, *Indoor air*.

This fourth edition cancels and replaces the third edition (ISO 16000-3:2022), which has been technically revised.

The main change is as follows: [Annex A](#) has been added which provides a suitable method for the determination of acrolein.

A list of all parts in the ISO 16000 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

ISO/FDIS 16000-3:2026(en)

Introduction

This document is intended to be used for characterizing indoor air following the sampling strategy specified in ISO 16000-2 [1]. This document applies to 14 aldehydes and ketones. Formaldehyde is the simplest carbonyl compound, with one carbon, one oxygen and two hydrogen atoms. In its monomolecular state, formaldehyde is a colourless, pungent and reactive gas. Formaldehyde has been used in the production of urea-formaldehyde resins, adhesives and insulating foams. Emissions from particle (chip) board and wall insulation are the major sources of formaldehyde in indoor air. As formaldehyde has a high toxic potential [2], determining its level accurately is key for air quality.

When formaldehyde is collected by passing air through a reactive medium that converts the compound to a derivative of lower vapour pressure is more efficiently retained by the sampler and its level can be easily analysed.

ISO 16017-1 [3], ISO 16017-2 [4], ISO 12219-1 [5] and ISO 12219-5 [6] describe analytical methods for a broader spectrum of volatile organic compounds (VOC) and can be used if other groups besides carbonyl compounds are to be analyzed.

Instead of systematic IUPAC nomenclature, traditional names are used in this document. Some equivalent names are:

- acetaldehyde for ethanal;
- acetone for 2-propanone;
- butyraldehyde for butanal;
- capronaldehyde for hexanal;
- formaldehyde for methanal;
- isovaleraldehyde for 3-methylbutanal;
- propionaldehyde for propanal;
- m-tolualdehyde for 3-methylbenzaldehyde;
- o-tolualdehyde for 2-methylbenzaldehyde;
- p-tolualdehyde for 4-methylbenzaldehyde;
- valeraldehyde for pentanal.

Sample Document

get full document from standards.iteh.ai

Indoor air —

Part 3:

Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air — Active sampling method

Warning — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This document specifies a sampling method to determine the quantity of formaldehyde (HCHO) in the air with the range of approximately $1 \mu\text{g}/\text{m}^3$ to $1 \text{ mg}/\text{m}^3$ in a time-weighted average (TWA) sample, for long-term (1 h to 24 h) and short-term (5 min to 60 min) sampling. This method involves the collection of compounds from air on to adsorbent cartridges coated with 2,4-dinitrophenylhydrazine (DNPH) and subsequent analysis of the hydrazones formed by high performance liquid chromatography (HPLC) with detection by ultraviolet absorption^{[7][8]}.

This document can also be applied for the determination of at least 12 other aromatic as well as saturated and unsaturated aliphatic carbonyl compounds (aldehydes and ketones), with modification, such as:

- acetaldehyde;
- acetone;
- benzaldehyde;
- butyraldehyde;
- capronaldehyde;
- 2,5-dimethylbenzaldehyde;
- formaldehyde;
- isovaleraldehyde;
- propionaldehyde;
- m-tolualdehyde;
- o-tolualdehyde;
- p-tolualdehyde;
- valeraldehyde.

This document does not apply to longer chained or unsaturated carbonyl compounds such as acrolein. An alternative sampling method using sorbent tubes and analysis by thermal desorption using gas chromatography with mass spectrometry (GC-MS) is given in [Annex A](#).