International Standard

ISO 12219-11

First edition
2025-05

Interior air of road vehicles —

Part 11: Thermal desorption analysis of organic emissions for the characterization on non-metallic materials for vehicles

Air intérieur des véhicules routiers —

Partie 11: Analyse par désorption thermique des émissions organiques pour la caractérisation des matériaux non métalliques

Reference number
ISO 12219-11:2025(en)

© ISO 2025



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025

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

Contents

Page

Foreword ..... **v**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Abbreviated terms **2**

5 Sampling and storage **3**

6 Apparatus and performance characteristics **3**
6.1 Apparatus 3
6.2 Performance characteristics 3

7 Analysis **4**
7.1 General information on thermal desorption analysis 4
7.2 Cleaning of the desorption tubes 5
7.3 System checks 5
7.3.1 General 5
7.3.2 Check standard solution 6
7.4 Calibration 7
7.4.1 General 7
7.4.2 Calibration solutions 7
7.4.3 Injection of the calibration or check standard 7
7.4.4 Tenax TA® desorption tube 7
7.5 Sample analysis process 7
7.5.1 Photographic documentation of the samples 7
7.5.2 Trimming and weighing of the samples 7
7.5.3 Calibration run, determination of calibration factors (response factor) 8
7.6 Chromatographic evaluation 8
7.6.1 General 8
7.6.2 Integration limits relevant for quantification 9
7.6.3 Peak integration 9
7.6.4 Evaluation for rider peaks and “oil-hills” 9
7.6.5 Calculation of emissions 10
7.6.6 Qualitative analysis 10
7.6.7 Reporting of the analytical results 11

8 Validation parameters **12**
8.1 Typical measured value variation for real samples 12
8.2 Quantification limit or linearity of toluene 13
8.3 Variation and recovery of toluene 14

9 Known problems and possible sources of errors **14**
9.1 Sample preparation 14
9.2 Difficult samples with non-uniform surface 14
9.3 Samples with higher water content 14
9.4 Lower results when desorption stream is too low 15
9.4.1 General 15
9.4.2 Differences between sample tubes made of metal and glass 15
9.5 Over or under results due to deviations in the thermal desorption temperature 15
9.6 Danger of confusion during the identification of the substance 16
9.7 Exceeding the detector linearity in the case of high emission values 17

Annex A (informative) **Material specific test portions** **18**

Annex B (informative) **Production of paint films for thermal desorption** **20**

Annex C (informative) **Examples for suitable test equipment, test parameters and possible errors** **22**

© ISO 2025 – All rights reserved

Annex D (informative) **Preparation of standard solutions** **32**
Bibliography **33**

© ISO 2025 – All rights reserved

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*.

A list of all parts in the ISO 12219 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 2025 – All rights reserved

Interior air of road vehicles —

Part 11:
Thermal desorption analysis of organic emissions for the characterization on non-metallic materials for vehicles

1 Scope

This document describes an analytical method to determine the emissions from non-metallic materials used for moulded parts in motor vehicles, such as textiles, carpets, adhesives, sealing compounds, forms, leather, plastic parts, films and sheets, paints or material combinations.

The materials are characterized in terms of the type and quantity of organic substances that can be outgassed from them. For this purpose, two semiquantitative sum values are determined, which allow an estimation of the emissions of volatile organic compounds (VOC value) and the proportion of condensable substances [low volatile "fogging" compound (FOG) value]. Furthermore, individual substances of the emission are determined. During the analysis, the samples are thermally extracted, the emissions are separated by gas chromatography and detected by mass spectrometry. The test method presented in this document provides values that are valid only for conditions described in this document.

The results which can be achieved using this method are not appropriate for making further estimations of any kind of the health effects of emitted substances nor should they be used might that can be found in the interior of a complete vehicle in stationary condition, while driving or in conditions similar to driving.

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 16000-6, *Indoor air — Part 6: Determination of organic compounds (VVOC, VOC, SVOC) in indoor and test chamber air by active sampling on sorbent tubes, thermal desorption and gas chromatography using MS or MS FID*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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
volatile organic compound value
VOC value
total volatile organic compound value
total of the readily volatile to medium volatile substances

Note 1 to entry: The VOC value is calculated as a toluene equivalent. The method described in this document allows substances in the boiling/elution range from the beginning of the chromatogram up to n-Pentacosane (C25) to be determined and analysed.

© ISO 2025 – All rights reserved