SLOVENSKI STANDARD
oSIST prEN ISO 22518:2020

01-september-2020

Barve in laki - Določevanje topil v premazih, ki jih lahko razredčimo z vodo - Metoda s plinsko kromatografijo (ISO 22518:2019)

Paints and varnishes - Determination of solvents in water-thinnable coating materials - Gas-chromatographic method (ISO 22518:2019)

Beschichtungsstoffe - Bestimmung von Lösemitteln in wasserverdünnbaren Beschichtungsstoffen - Gaschromatographisches Verfahren (ISO 22518:2019)

Peintures et vernis - Détermination des solvants dans des peintures diluable à l'eau - Méthode par chromatographie en phase gazeuse (ISO 22518:2019)

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN ISO 22518:2021
https://standards.iteh.ai/catalog/standards/sist/b8c75d56-c114-415b-833e-82083fd5889b/sist-en-iso-22518-2021

Ta slovenski standard je istoveten z: prEN ISO 22518

ICS:

87.040 Barve in laki Paints and varnishes

oSIST prEN ISO 22518:2020 en,fr,de

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

oSIST prEN ISO 22518:2020

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 22518:2021
https://standards.iteh.ai/catalog/standards/sist/b8c75d56-c1f4-415b-833e-82083fd5889b/sist-en-iso-22518-2021

oSIST prEN ISO 22518:2020

INTERNATIONAL STANDARD

ISO 22518

First edition
2019-07

Paints and varnishes — Determination of solvents in water-thinnable coating materials — Gas-chromatographic method

Peintures et vernis — Détermination des solvants dans des peintures diluable à l'eau — Méthode par chromatographie en phase gazeuse

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN ISO 22518:2021
https://standards.iteh.ai/catalog/standards/sist/b8c75d56-c1f4-415b-833e-82083fd5889b/sist-en-iso-22518-2021

Reference number
ISO 22518:2019(E)

© ISO 2019

oSIST prEN ISO 22518:2020

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 22518:2021
https://standards.iteh.ai/catalog/standards/sist/b8c75d56-c1f4-415b-833e-82083fd5889b/sist-en-iso-22518-2021

COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

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
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

oSIST prEN ISO 22518:2020

Contents

Page

Foreword ..... **iv**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Units **1**
5 Principle **1**
6 Apparatus **2**
6.1 Gas chromatograph 2
6.1.1 General 2
6.1.2 Sample injection system 2
6.1.3 Oven 2
6.1.4 Detector 2
6.1.5 Capillary separation column 3
6.1.6 Injection syringe 3
6.2 Data acquisition 3
6.3 Sample vessel 3
7 Reagents **3**
7.1 Gases 3
7.2 Internal standard 3
7.3 Calibration substances 3
7.4 Diluents 3
8 Sampling **4**
9 Choice of sample injection system **4**
10 Procedure **4**
10.1 Gas chromatographic conditions 4
10.1.1 General 4
10.1.2 Example of hot injection and gas chromatography of a water-thinnable coating material 4
10.1.3 Cold injection and gas chromatography of a water-thinnable coating material (example) 6
10.2 Injection volume 7
10.3 Calibration 7
10.4 Sample preparation and analysis 7
11 Expression of results **8**
12 Precision **8**
12.1 General 8
12.2 Repeatability 9
12.3 Reproducibility 9
13 Test report **9**
Bibliography **11**

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO 22518:2021
https://standards.iteh.ai/catalog/standards/sist/b8c75d56-c1f4-415b-833e-
8203f1589b1/sist-en-iso-22518-2021

© ISO 2019 – All rights reserved

oSIST prEN ISO 22518:2020

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 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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

SIST EN ISO 22518:2021

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 2019 – All rights reserved

oSIST prEN ISO 22518:2020

Paints and varnishes — Determination of solvents in water-thinnable coating materials — Gas-chromatographic method

1 Scope

This document specifies a method for the gas-chromatographic determination of the solvents in water-thinnable paints and varnishes, binder solutions, emulsions and dispersions.

With the precision stated in Clause 13, single components above 0,02 % (mass fraction) can be determined quantitatively.

The method defined in this document is not applicable for the determination of Volatile Organic Compounds (VOC) and Semi-Volatile Organic Compounds (SVOC) content.

NOTE For the determination of VOC and SVOC, see ISO 11890-2[2].

2 Normative references

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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 4618, *Paints and varnishes — Terms and definitions*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

SIST EN ISO 22518:2021
https://standards.iteh.ai/catalog/standards/sist/b8c75d56-e1f4-4158-853e-82083fd5889b/sist-en-iso-22518-2021

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4618 apply.

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

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

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

4 Units

The analytical results are expressed as a percentage mass fraction.

5 Principle

After sample preparation, the components contained in the sample under test are separated by gas chromatography. Either a hot or a cold sample injection system can be used, depending on the product type. After the components have been identified, they are quantified from the peak areas using the internal standard method.

© ISO 2019 – All rights reserved

oSIST prEN ISO 22518:2020

6 Apparatus

6.1 Gas chromatograph

6.1.1 General

The gas chromatograph shall be suitable for use with capillary separation columns and meet the conditions specified in 6.1.2 to 6.1.4.

All of the instrumental parts coming into contact with the test sample shall be made of a material, e.g. glass, which is resistant to the sample and which will not change it chemically.

6.1.2 Sample injection system

6.1.2.1 Hot injection system

The instrument shall have a variable-temperature injection block with a sample splitter. The injection temperature shall be capable of being set to an accuracy of 1 K. The split ratio shall be adjustable and capable of being monitored. The sample splitter insert shall contain silanized glass wool to retain non-volatile constituents. It shall be cleaned and provided with new glass wool packing or replaced as required to rule out errors due to residues of binder or pigment (e.g. adsorption of solvents). The occurrence of adsorption is revealed by peak tailing, in particular with components of low volatility.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN ISO 22518:2021
https://standards.iteh.ai/catalog/standards/sist/b8c75d56-c1f4-415b-833e-
62e9fadc89b/sist-en-iso-22518-2021

6.1.2.2 Cold injection system

The cold injection system shall be provided with temperature programming for heating from room temperature to 300 °C and shall have a sample splitter inlet made of a material such as glass. It shall be provided with a silanized glass wool packing and shall be treated as specified in 6.1.2.1. In this case too, the split ratio shall be adjustable and capable of being monitored.

6.1.2.3 Automatic sample injection system

The precision of the method will be increased if the injection systems, especially the hot injection system, are coupled to an auto injector. The manufacturer's instructions shall be followed when an auto injector is used.

6.1.3 Oven

The oven shall be capable of being heated between 40 °C and 300 °C both isothermally and under programmed temperature control. It shall be possible to set the oven temperature to within 1 K. The final temperature of the temperature program shall not exceed the maximum operating temperature of the separation column (see manufacturer's instructions).

6.1.4 Detector

A Flame Ionization Detector (FID) which is capable of being operated at temperatures up to 300 °C shall be used. To prevent condensation, the detector temperature shall be at least 10 K above the maximum oven temperature. The detector gas supply, injection volume, split ratio and gain setting shall be optimized so that the signals (peak areas) used for the calculation are proportional to the amount of substance

If the separated components are identified by a mass spectrometer, mass-selective detector of Fourier-transform infrared spectrometer (FT-IR spectrometer), these instruments shall be coupled to the gas chromatograph and operated in accordance with the manufacturer's instructions.

 © ISO 2019 – All rights reserved

oSIST prEN ISO 22518:2020

6.1.5 Capillary separation column

The capillary separation column shall be made of glass or fused silica. To obtain overall chromatograms, use capillary separation columns (for example of length 50 m and internal diameter 0,2 mm) coated with polydimethylsiloxane or poly (ethylene glycol) at a film thickness of e.g. 0,2 µm. The stationary phase and column length shall be varied to suit the particular separation (see examples in 10.1). The resolution, R, of the peaks to be separated shall be at least 1,5.

6.1.6 Injection syringe

The injection syringe shall have a capacity between 0,5 µl and 10 µl and shall have 0,1 µl scale divisions.

6.2 Data acquisition

The signals from the detector are recorded by means of an electronic data-acquisition system. The integration parameters used in calibration and analysis shall be identical.

6.3 Sample vessel

A suitable sample vessel is one made of chemically inert material, such as glass, which can be sealed with, for example, a rubber membrane which has a coating of polytetrafluoroethylene (PTFE). The vessel shall be filled to about 90 % of capacity.

7 Reagents

iTeh STANDARD PREVIEW
(standards.iteh.ai)

7.1 Gases

7.1.1 Carrier gas, dry oxygen-free helium, nitrogen or hydrogen having a purity of at least 99,996 % (volume fraction).

SIST EN ISO 22518:2021
https://standards.iteh.ai/catalog/standards/sist/b8c75d56-c1f4-415b-833e-82083fd5889b/sist-en-iso-22518-2021

7.1.2 Detector gases, hydrogen having a purity of at least 99,999 % (volume fraction) and (synthetic) air free of organic compounds.

7.1.3 Auxiliary gas, nitrogen or helium of the same quality as the carrier gas.

Suitable filters shall be installed in the gas chromatograph connection pipes to adsorb residual impurities (see the gas chromatograph operating instructions).

7.2 Internal standard

The internal standard shall be a solvent which is completely separated from the other components, for example, isobutanol, CAS-No 78-83-1[1)] or diethylene glycol dimethyl ether, CAS-No 111-96-6. The internal standard shall be inert with respect to the sample constituents, stable in the required temperature range, and of known purity.

7.3 Calibration substances

The solvent used for the calibration shall have a purity of at least 99 % (mass fraction) or shall be of known purity.

7.4 Diluents

Organic diluents such as methanol, CAS-No 67-56-1, or tetrahydrofuran, CAS-No 109-99-9, are suitable for diluting the sample. The diluents shall have a purity of at least 99 % (mass fraction) or be of known

1) CAS-No: Chemical Abstracts Service Registry Number.

© ISO 2019 – All rights reserved

oSIST prEN ISO 22518:2020

purity and shall not contain any substances which interfere with the determination by for example causing overlapping peaks in the chromatogram.

8 Sampling

Take a representative sample, as described in ISO 15528.

9 Choice of sample injection system

The choice between hot injection and cold injection will depend on the type of product under test. It is necessary to use the cold injection system for products which, at high temperature, release substances which interfere with the determination.

Indications of cleavage or decomposition reactions can be obtained by looking for changes in the chromatogram (for example the occurrence of foreign peaks or increase decrease in peak size) at various sample injector temperatures.

The two sample injection systems have been studied in interlaboratory tests, where the following observations were made.

The hot injection system includes all of the volatile constituents, solvents and cleavage products of the binders and additives. Cleavage products of the binders or additives which are identical to a solvent component can be separated by a cold injection system, since they elute later as a result of the programmed increase in injection block temperature (see Figure 2).

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN ISO 22518:2021
https://standards.iteh.ai/catalog/standards/sist/b8c75d56-c1f4-415b-833e-82083fd5889b/sist-en-iso-22518-2021

10 Procedure

10.1 Gas chromatographic conditions

10.1.1 General

The gas chromatographic conditions used will depend on the product to be analyzed and shall be optimized each time using a known solvent mixture. 10.1.2 and 10.1.3 give examples of conditions for use with hot injection and cold injection, respectively.

10.1.2 Example of hot injection and gas chromatography of a water-thinnable coating material

Injector temperature:	250 °C	
Split ratio:	1: 40	
Injection volume:	0,5 µl, automatic injection	
Oven temperature program:	initial temperature:	70 °C
	isothermal holding time:	3 min
	heating rate:	10 K/min
	final temperature:	200 °C
	isothermal holding time:	25 min
Detector temperature:	260 °C	

 © ISO 2019 – All rights reserved