



SLOVENSKI STANDARD
kSIST-TS FprCEN ISO/TS 2610:2023
01-april-2023

Analiza zemeljskega plina - Biometan - Določevanje aminov (ISO/TS 2610:2022)

Analysis of natural gas - Biomethane - Determination of amines content (ISO/TS 2610:2022)

iTeh STANDARD PREVIEW

Analyse du gaz naturel - Biométhane - Détermination de la teneur en amines (ISO/TS 2610:2022)

Ta slovenski standard je istoveten z: **FprCEN ISO/TS 2610**

ICS:

75.060

Zemeljski plin

Natural gas

kSIST-TS FprCEN ISO/TS 2610:2023

en,fr,de

TECHNICAL
SPECIFICATION

ISO/TS
2610

First edition
2022-08

**Analysis of natural gas — Biomethane
— Determination of amines content**

*Analyse du gaz naturel — Biométhane — Détermination de la teneur
en amines*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[KSIST-TS FprCEN ISO/TS 2610:2023](https://standards.iteh.ai/catalog/standards/sist/708954fb-39c2-4ea8-b988-bb718dcc7552/ksist-ts-fprcen-iso-ts-2610-2023)

[https://standards.iteh.ai/catalog/standards/sist/708954fb-39c2-4ea8-b988-
bb718dcc7552/ksist-ts-fprcen-iso-ts-2610-2023](https://standards.iteh.ai/catalog/standards/sist/708954fb-39c2-4ea8-b988-bb718dcc7552/ksist-ts-fprcen-iso-ts-2610-2023)



Reference number
ISO/TS 2610:2022(E)

© ISO 2022

iTeh STANDARD PREVIEW (standards.iteh.ai)

[KSIST-TS FprCEN ISO/TS 2610:2023](https://standards.iteh.ai/catalog/standards/sist/708954fb-39c2-4ea8-b988-bb718dcc7552/ksist-ts-fprcen-iso-ts-2610-2023)

<https://standards.iteh.ai/catalog/standards/sist/708954fb-39c2-4ea8-b988-bb718dcc7552/ksist-ts-fprcen-iso-ts-2610-2023>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2022

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.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Reference conditions.....	2
5 Principle.....	2
6 Reagents and equipment.....	2
7 Sampling.....	3
8 Preparation of the calibration tubes.....	3
9 Analysis.....	4
9.1 Thermal desorption.....	4
9.2 Program temperature of the GC separation.....	4
9.3 Sample analysis.....	4
9.4 Quantification method.....	5
10 Performance characteristics.....	5
11 Calculations.....	5
12 Test report.....	6
Annex A (informative) Characteristics of the amines to be quantified.....	8
Bibliography.....	9

<https://standards.iteh.ai/catalog/standards/sist/708954fb-39c2-4ea8-b988-bb718dcc7552/ksist-ts-fprcen-iso-ts-2610-2023>

ISO/TS 2610:2022(E)

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.

This document was prepared by Technical Committee ISO/TC 193, *Natural gas*, Subcommittee SC 1, *Analysis of natural gas*.

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.

Introduction

This document was developed in response to biomethane specifications such as EN 16723 (all parts)^[2]. In other regions, other specifications can apply for biomethane.

In the process of biogas upgrading into biomethane, alkanolamines are used for removing of sulphur-containing components and carbon dioxide. Due to this reason, trace level of these components can be present in biomethane. This method is suited for the detection of these components as well as the determination of their concentration. To inject biomethane into natural gas grids and to use it as an automotive fuel, it needs to meet specifications. For amines the maximum limit value in biomethane is set as 10 mg/m³ is set in EN 16723 (all parts)^[2]. Other specifications can state other thresholds.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[kSIST-TS FprCEN ISO/TS 2610:2023](https://standards.iteh.ai/catalog/standards/sist/708954fb-39c2-4ea8-b988-bb718dcc7552/ksist-ts-fprcen-iso-ts-2610-2023)

<https://standards.iteh.ai/catalog/standards/sist/708954fb-39c2-4ea8-b988-bb718dcc7552/ksist-ts-fprcen-iso-ts-2610-2023>

Analysis of natural gas — Biomethane — Determination of amines content

1 Scope

This document specifies the determination of the concentration of alkanolamines in biomethane. The measurement method involves thermal desorption gas chromatography with flame ionization and/or mass spectrometry detectors (TD-GC-MS/FID). The described method is specifically developed for the analysis of five amine compounds, namely:

- monoethanolamine (MEA);
- diglycolamine (DGA);
- diethanolamine (DEA);
- *N*-methyldiethanolamine (MDEA);
- piperazine (PZ).

Information about the compounds is given in [Annex A](#).

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 10715, *Natural gas — Sampling guidelines*

ISO 14532, *Natural gas — Vocabulary*

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*

ISO 19229, *Gas analysis — Purity analysis and the treatment of purity data*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14532 and the following 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 <https://www.electropedia.org/>

3.1 amine

chemical compound consisting nitrogen atoms bound to hydrogen and/or carbon atoms having the general formula R_3N

[SOURCE: ISO/TR 27912:2016, 3.5]

ISO/TS 2610:2022(E)

3.2

gas chromatography-mass spectrometry

GC-MS

method that combines the features of gas-liquid chromatography and mass spectrometry to qualitatively and quantitatively analyse volatile compounds within a test sample

[SOURCE: ISO/TS 16550:2014, 2.3]

4 Reference conditions

Unless stated otherwise, all volumes and concentrations in this document are for real dry gas at ISO Standard Reference conditions of 15 °C and 101,325 kPa (see ISO 13443).

Other reference conditions may be chosen if the context in which the measurements are performed, or the results to be used, dictate to do so.

5 Principle

A known volume of biomethane is actively sampled on a sorbent tube. Amines compounds are then trapped on the sorbent and tubes are analysed in laboratory. Analysis is performed by thermal desorption at high temperature. When desorbed, compounds are sent on a cold trap prior to their transport in the gas chromatograph column and their detection by flame ionisation detector and/or mass spectrometry.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

6 Reagents and equipment

6.1 Calibration standards.

6.1.1 Amine standards, pure amine components shall be used, and their purity shall be assessed in accordance with ISO 19229. Amines (except DGA) should be at least 99 % purity grade. For DGA, purity should be at least 98 %.

6.1.2 Reference standard, *N*-octane of at least 99 % purity grade.

6.2 Dilution solvent, methanol (chromatographic quality) shall be used as dilution solvent for the preparation of calibration standards.

6.3 Sorbent tubes, equipped with a suitable sorbent. It is also recommended to use stainless steel tubes with proper coating treatment (amines are photosensitive).

EXAMPLE Tenax TA^{®1)} based polymer (2,6-diphenylene oxide polymer).

6.4 Gas chromatograph (GC), equipped with a flame ionization detector (FID) and/or a mass spectrometer (MS). Moreover, the GC shall be equipped with a thermal desorption system associated to a cryogenic trap.

If an FID is used, the selectivity of the method regarding amines shall be established (see ISO 6974-1). As biomethane composition regarding trace compounds (e.g., terpenes) is related to the nature of the inputs, the method shall be tested towards a real biomethane sample, and adapt it if necessary to avoid coelution of components.

1) Tenax[®] is a registered trademark of Buchem BV, Apeldoorn, the Netherlands. This information is given for the convenience of users and does not constitute an endorsement by ISO for the product named.