

<b>STN</b>	<b>Analýza zemného plynu Biometán Časť 2: Stanovenie obsahu siloxánu plynovou chromatografiou s iónovou pohyblivostnou spektrometriou (ISO 2613-2: 2023)</b>	<b>STN EN ISO 2613-2</b>  38 6130
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Analysis of natural gas - Silicon content of biomethane - Part 2: Determination of siloxane content by gas chromatography with ion mobility spectrometry (ISO 2613-2:2023)

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 02/24

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EUROPEAN STANDARD

EN ISO 2613-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2023

ICS 75.060

English Version

Analysis of natural gas - Silicon content of biomethane -  
Part 2: Determination of siloxane content by gas  
chromatography with ion mobility spectrometry (ISO  
2613-2:2023)

Analyse du gaz naturel - Teneur en silicium du biométhane - Partie 2: Détermination de la teneur en siloxane par chromatographie en phase gazeuse avec spectrométrie de mobilité ionique (ISO 2613-2:2023)

Analyse von Erdgas - Siliziumanteil von Biomethan - Teil 2: Bestimmung des Siloxananteils durch gaschromatographische Ionenmobilitätsspektrometrie (ISO 2613-2:2023)

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**EN ISO 2613-2:2023 (E)**

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## **European foreword**

This document (EN ISO 2613-2:2023) has been prepared by Technical Committee ISO/TC 193 "Natural gas" in collaboration with Technical Committee CEN/TC 408 "Natural gas and biomethane for use in transport and biomethane for injection in the natural gas grid" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2024, and conflicting national standards shall be withdrawn at the latest by June 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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## **Endorsement notice**

The text of ISO 2613-2:2023 has been approved by CEN as EN ISO 2613-2:2023 without any modification.

# INTERNATIONAL STANDARD

# ISO 2613-2

First edition  
2023-11

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## **Analysis of natural gas — Silicon content of biomethane —**

### **Part 2: Determination of siloxane content by gas chromatography with ion mobility spectrometry**

*Analyse du gaz naturel — Teneur en silicium du biométhane —*

*Partie 2: Détermination de la teneur en siloxanes par  
chromatographie en phase gazeuse avec spectrométrie de mobilité  
ionique*



Reference number  
ISO 2613-2:2023(E)

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## ISO 2613-2:2023(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](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 193, *Natural gas*, Subcommittee SC 1, *Analysis of natural gas*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 408, *Natural gas and biomethane for use in transport and biomethane for injection in the natural gas grid*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 2613 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](http://www.iso.org/members.html).



## Introduction

This document describes a method for the determination of the siloxane content of biomethane that is applicable to both laboratory and online analyses.

Siloxanes are a common contaminant in biogas, caused by their extensive use in common household products such as cosmetics and detergents. These products eventually become entrained in waste streams that are used to generate biogas. Additionally, siloxanes are sometimes added to digesters as anti-foaming agents to improve generation efficiency.

If not effectively removed, siloxanes can cause damage to gas processing and vehicle injection equipment through formation of silica deposits at high temperatures. Many gas distributors require measurement reports to demonstrate that the resultant biomethane conforms with their requirements, which typically includes siloxane content due to its potential to cause damage. Additionally, producers may wish to monitor siloxane content for process optimisation purposes.

The technique described in this document is commercially available and tailored specifically to measuring siloxanes within biomethane at low concentrations (for instance, as specified in EN 16723-1<sup>[10]</sup> and EN 16723-2<sup>[11]</sup>). It is suitable for use both in the laboratory and field.

# Analysis of natural gas — Silicon content of biomethane —

## Part 2:

# Determination of siloxane content by gas chromatography with ion mobility spectrometry

## 1 Scope

This document describes a gas chromatography – ion mobility spectroscopy (GC-IMS) method for the determination of the concentration of siloxanes in biomethane. The method is applicable to the following siloxanes:

- hexamethyldisiloxane (L2);
- octamethyltrisiloxane (L3);
- decamethyltetrasiloxane (L4);
- dodecamethylpentasiloxane (L5);
- hexamethylcyclotrisiloxane (D3);
- octamethylcyclotetrasiloxane (D4);
- decamethylcyclopentasiloxane (D5);
- dodecamethylcyclohexasiloxane (D6).

This document describes suitable calibration and measurement strategies to quantify siloxanes in (bio) methane around and above the  $0,3 \text{ mg m}^{-3}$  ( $14 \text{ } \mu\text{mol mol}^{-1}$ ) level and applies to analyses within absolute pressure ranges of 1 bar – 2 bar<sup>1)</sup>, temperatures of 0 °C – 40 °C and relative humidity < 90 %.

## 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 6142-1, *Gas analysis — Preparation of calibration gas mixtures — Part 1: Gravimetric method for Class I mixtures*

ISO 6143, *Gas analysis — Comparison methods for determining and checking the composition of calibration gas mixtures*

ISO 6144, *Gas analysis — Preparation of calibration gas mixtures — Static volumetric method*

ISO 6145-1, *Gas analysis — Preparation of calibration gas mixtures using dynamic methods — Part 1: General aspects*

ISO 7504, *Gas analysis — Vocabulary*

ISO 10715, *Natural gas — Gas sampling*

1) 1 bar = 0,1 MPa =  $10^5$  Pa; 1 MPa = 1 N/mm<sup>2</sup>.

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ISO 10723, *Natural gas — Performance evaluation for analytical systems*

ISO 14532, *Natural gas — Vocabulary*

ISO 14912, *Gas analysis — Conversion of gas mixture composition data*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

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