

**Natural gas - Determination of sulfur compounds -
Part 1: General introduction**

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 6326-1:2010 sisaldab Euroopa standardi EN ISO 6326-1:2009 ingliskeelset teksti.

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ICS 75.060

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English Version

Natural gas - Determination of sulfur compounds - Part 1:
General introduction (ISO 6326-1:2007)

Gaz naturel - Détermination des composés soufrés - Partie
1: Introduction générale (ISO 6326-1:2007)

Erdgas - Bestimmung von Schwefelverbindungen - Teil 1:
Allgemeine Einleitung (ISO 6326-1:2007)

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

The text of ISO 6326-1:2007 has been prepared by Technical Committee ISO/TC 193 "Natural gas" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 6326-1:2009.

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of an identical text or by endorsement, at the latest by January 2010, and conflicting national standards shall be withdrawn at the latest by January 2010.

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Endorsement notice

The text of ISO 6326-1:2007 has been approved by CEN as EN ISO 6326-1:2009 without any modification.

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Introduction

Sulfur compounds can occur naturally in natural gas and remain as traces after treatment, or they may have been injected deliberately to allow subsequent olfactory detection for safety reasons.

The standardization of several methods for the determination of sulfur compounds in natural gas is necessary in view of the diversity of these compounds [hydrogen sulfide, carbonyl sulfide, tetrahydrothiophene (THT), etc.] and the requirements of the determinations (required uncertainty, measurement at the well head, at clean-up plant or in the transmission pipes, etc.).

In order to enable the user to choose the method most appropriate to his needs and to perform the measurements under the best conditions, ISO 6326 has been prepared in several parts.

This part of ISO 6326 gives a rapid comparison of standardized methods and therefore provides information for the choice of the method.

The other parts of ISO 6326 and ISO 19739 describe in detail the various standardized methods.

Natural gas — Determination of sulfur compounds —

Part 1: General introduction

WARNING — The majority of sulfur compounds are extremely toxic and thus present a serious health hazard if handled without precautions.

1 Scope

This part of ISO 6326 gives a brief description of standardized methods that can be used for the determination of sulfur compounds in natural gas.

The principle of each method is described generally, the range of concentrations for which the method is suitable is indicated, and the analytical range and precision of each method is given. It should enable the user to select judiciously the proper method for the application being considered. Sulfur analysis is performed in order to determine

- a) total sulfur,
- b) sulfur contained in specific groups (e.g. thiol sulfur),
- c) individual sulfur compounds, and
- d) specific groups of sulfur compounds.

The standardized methods available in the field of sulfur analysis are

- the Wickbold combustion method: for total sulfur determination (ISO 4260),
- the Lingener combustion method: for total sulfur determination (ISO 6326-5),
- gas chromatography: for determination of individual sulfur compounds (ISO 19739), and
- potentiometry: for determination of hydrogen sulfide, carbonyl sulfide and thiol compounds (ISO 6326-3).

Other methods for the determination of sulfur compounds are available but are not considered here. Table 1 gives an overview of the standardized methods which can be used for the determination of total sulfur, hydrogen sulfide, carbonyl sulfide, tetrahydrothiophene, thiol sulfur, individual thiols, individual thiophenes, individual organic sulfides and disulfides.

Table 1 — Methods for the determination of sulfur compounds in natural gas

Determination	Method	Concentration range ^a mg/m ³	Reference
Total sulfur	Wickbold combustion method	1 to 20 000	ISO 4260
	Lingener combustion method	0,5 to 1 000	ISO 6326-5
Hydrogen sulfide (H ₂ S)	Potentiometry	≥ 1	ISO 6326-3
	Gas chromatography	0,1 to 100 (or 0,5 to 600 depending on the detector used)	ISO 19739
Carbonyl sulfide (COS)	Gas chromatography	0,1 to 30	ISO 19739
	Potentiometry	≥ 1	ISO 6326-3
Tetrahydrothiophene (THT)	Gas chromatography	0,1 to 100	ISO 19739
Thiol sulfur	Potentiometry	≥ 1	ISO 6326-3
Individual thiols	Gas chromatography	0,1 to 100	ISO 19739
Individual thiophenes	Gas chromatography	0,1 to 100	ISO 19739
Individual organic sulfides and disulfides	Gas chromatography	0,1 to 100	ISO 19739

^a For the determination of total sulfur, the sulfur content is expressed as milligrams of sulfur per cubic metre of gas. For the determination of sulfur compounds, the mass concentration of sulfur compounds is expressed as milligrams of sulfur compound per cubic metre of gas.

2 Normative references

The following referenced documents are indispensable for the application 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 4260, *Petroleum products and hydrocarbons — Determination of sulfur content — Wickbold combustion method*

ISO 6326-3, *Natural gas — Determination of sulfur compounds — Part 3: Determination of hydrogen sulfide, mercaptan sulfur and carbonyl sulfide sulfur by potentiometry*

ISO 6326-5, *Natural gas — Determination of sulfur compounds — Part 5: Lingener combustion method*

ISO 10715, *Natural gas — Sampling guidelines*

ISO 16664, *Gas analysis — Handling of calibration gases and gas mixtures — Guidelines*

ISO 19739:2004, *Natural gas — Determination of sulfur compounds using gas chromatography*

3 Sampling

3.1 General

The sampling procedures are very important in the analysis of sulfur compounds. Sulfur compounds have a strong tendency to adsorb on to, or to chemically react with, different materials of construction. Low contents of sulfur compounds in samples and calibration gas mixtures put demands on the sampling procedure in order to ensure that the sulfur compounds in correct quantity reach the analytical device.