



**International
Standard**

ISO 23219

**Natural gas — Format for data from
gas chromatograph analysers for
natural gas — XML file format**

*Gaz naturel — Format pour les données des analyseurs de
chromatographie en phase gazeuse pour le gaz naturel —
Format de fichier XML*

**Second edition
2026-10**

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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).

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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*.

This second edition cancels and replaces the first edition (ISO 23219:2022), which has been technically revised.

The main changes are as follows:

- XML tags for the determination of sulfur compounds by gas chromatography have been added to the text and [Annex A](#);
- Annex B, Annex C and Annex D have been removed and converted into an XML file in the ISO Maintenance Portal in electronic format;
- “Example of a gas certificate for sulfur compound analysis” and “Example of sulfur compound analysis” have been added to the ISO Maintenance Portal in electronic format;
- [Annex B](#) has been updated based on the addition of XML tags for sulfur compound analysis;
- information on InChI for several sulfur compounds has been added to [Annex C](#).

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

There are multiple suppliers of analysers for the measurement of natural gas composition and sulfur compounds. If correctly set up, there is no reason to prefer any one in particular, since they give comparable results. However, this gives rise to a variety of methods of reporting data, which can create confusion over the use of such data for offline calculation of properties or evaluation of analyser performance.

Therefore, a uniform method of data presentation, independent of the source of the analyser, as presented in this document is considered valuable.

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Natural gas — Format for data from gas chromatograph analysers for natural gas — XML file format

1 Scope

This document specifies a text file format – XML file format – for reporting natural gas analysis results and other data relevant to natural gas, natural gas substitutes and other combustible gaseous fuels. The file name is applicable when it includes the extension of .XML (case insensitive).

The XML file format is useful for output from, for example, ISO 6974-1 for composition, ISO 19739 for sulfur compounds and ISO 6974-2 for uncertainty, as input for ISO 6976 for properties calculation or ISO 10723 for performance evaluation. Typically, these are the gas composition as provided on an analysis certificate. The format can also be used for the results of properties calculation or a performance evaluation that can be read into a spreadsheet editor or data processing.

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 8601-1, *Date and time — Representations for information interchange — Part 1: Basic rules*

3 Terms and definitions

No terms and definitions are listed in this document.

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>

4 Basic instructions

4.1 Syntax

XML is composed of a hierarchical structure of elements which contain text data.

Elements are defined by an opening tag which comprises the element name enclosed in angular bracket, e.g. <value> and a closing tag with / in front of the element name, e.g. </value>.

4.2 Element names

Element names shall be lowercase (including inchi, which is usually written as InChI).

Any multiple word element names shall be concatenated with underscore, e.g. <retention_time>.

In general, element names should be complete words, rather short forms or acronyms.

4.3 Attributes

Tags shall not contain attributes, i.e. do not use:

```
<amount value="391.043">
```

```
<units>
```

```
<unit>mg/m3</unit>
```

```
<reference_conditions>....</reference_conditions>
```

```
</units>
```

```
</amount>
```

Instead, use:

```
<amount>
```

```
<value>391.043</value>
```

```
<units>
```

```
<unit>mg/m3</unit>
```

```
<reference_conditions>....</reference_conditions>
```

```
</units>
```

```
</amount>
```

4.4 Element data

The text content of elements, e.g. keywords, are case insensitive. Leading and trailing spaces are ignored.

4.5 Schema

The format of the XML file is defined in the schema given in [Annex A](#).

The element names in the tags defined in the schema are case sensitive (they are all lowercase) and have no leading or trailing spaces. The tags have no attributes, i.e. no name="value" within the tag.

4.6 Date and time

Date and time are tagged <date_time> and shall use the convention specified in ISO 8601-1, e.g. <date_time>2018-07-10T13:59:00+01</date_time>

This data may be used for:

- date and time of sample registration;
- date and time when the results were produced;
- date and time when the results were validated;
- date and time when the report was issued.

4.7 Numeric datatype

The numeric datatype decimal (type xs:decimal or xs:float/xs:double) shall be chosen. Numbers shall not contain spaces and shall use a period as the decimal separator; they shall not use grouping of digits, i.e. no

thousands separator (e.g. comma). E-notation shall be used for powers of 10, e.g. 34; 12,3; -3,4567; 5,6E3; and 7,8E-2.

4.8 Units

Units shall use a single solidus or -exponent, e.g. MJ/m³ (see annexes), or MJ·m⁻³. Units shall not contain spaces. Units should be considered case sensitive and case used e.g. to distinguish the International System of Units prefixes of m (milli) and M (mega).

4.9 Component data

Component data shall be contained in <peak> blocks (see [Annex A](#)).

4.10 Components names

Component names shall use the InChI (International Chemical Identifier) used by the International Union of Pure and Applied Chemistry (IUPAC). See [Annex C](#) for commonly used natural gas components. This is unambiguous, reasonably concise, non-proprietary and, since the chemical formula is part of the InChI, it is often clear what the component is. The alternative of using Chemical Abstracts Registry Number (CAS RN) is not so understandable and is proprietary.

4.11 Properties

Properties shall be contained in a <properties> block, with each individual property in a separate <property> block. The property is identified with a keyword rather than by an XML tag (see [Annex A](#)).

4.12 Example keywords

Example keywords and units are given in [Annex A](#).

In general, any keywords and units should be agreed between writing and reading applications.

Reading applications should ignore any keyword sections that are not relevant to their operation.

4.13 Checksum

The XML file shall have a checksum, e.g. CRC-16 check (hexadecimal) sum as displayed by ZIP programs, at the end of the file as an XML comment, e.g. <!--D86A3640-->. This is not intended for security purposes, merely as a confidence check that the file contents have not been corrupted.

4.14 Software

Software, capable of processing XML data to a spreadsheet editor and vice versa, is listed in [Annex B](#).

5 General comments to keywords and units

5.1 Possible keywords and units are given in [Annex A](#) (see also example XML files on ISO Maintenance Portal).

5.2 Example gas component names are specified in [Annex C](#).

5.3 Amount units:

- The amount of substance may be expressed as a fraction or percentage with an appropriate multiple or submultiple prefix.
- It should be indicated whether the amount fractions are normalised or non-normalised.