



**International
Standard**

ISO 25095-1

**Propylene oxide for industrial
use —**

Part 1:
**Determination of purity and trace
impurities by gas chromatography**

**First edition
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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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This document was prepared by Technical Committee ISO/TC 47, *Chemistry*.

A list of all parts in the ISO 25095 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.

Propylene oxide for industrial use —

Part 1:

Determination of purity and trace impurities by gas chromatography

WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.

1 Scope

This document specifies a test method for the determination of propylene oxide and trace impurities in propylene oxide for industrial use by gas chromatography.

This document is suitable for the determination of propylene oxide which is produced by ethylbenzene co-oxidation (PO/SM), isobutane co-oxidation (PO/TBA), cumene co-oxidation (CHPPO), hydrogen peroxide oxidation (HPPO) and chlorohydrin. This document is applicable for determination of propylene oxide with a purity $\geq 99,70$ % and impurity content $\geq 0,000 3$ %.

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 760, *Determination of water — Karl Fischer method (General method)*

ISO 3165:1976, *Sampling of chemical products for industrial use — Safety in sampling*

ISO 3170:2025, *Hydrocarbon Liquids — Manual sampling*

ISO 25095-2, *Propylene oxide for industrial use—Part 2: determination of aldehydes by Liquid chromatography*

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 Principle

Propylene oxide and impurities in a sample are separated by a gas chromatograph (GC) under appropriate conditions and detected by flame ionization detector (FID). Quantification is achieved by corrected peak-area normalization, the content of propylene oxide can be calculated after deducting water and total aldehydes, which are difficult to measure by GC/FID.

5 Reagents and materials

Unless otherwise specified, use only reagents of recognized analytical grade. If there are impurities to be considered other than those listed as follows, appropriate reagents can be used.

- 5.1 **Propylene**, CAS No. ©¹⁾ 115-07-1.
- 5.2 **Methanol solution of dimethyl ether**, CAS No. 115-10-6.
- 5.3 **Methanol**, CAS No. 67-56-1.
- 5.4 **n-Pentane**, CAS No. 109-66-0.
- 5.5 **Acetaldehyde**, CAS No. 75-07-0.
- 5.6 **Ethylene oxide**, CAS No. 75-21-8.
- 5.7 **Methyl formate**, CAS No. 107-31-3.
- 5.8 **Furan**, CAS No. 110-00-9.
- 5.9 **2-Methylpentane**, CAS No. 43133-95-5.
- 5.10 **iso-Propanol**, CAS No. 67-63-0.
- 5.11 **Dimethoxymethane**, CAS No. 109-87-5.
- 5.12 **n-Hexane**, CAS No. 110-54-3.
- 5.13 **Propylene oxide**, CAS No. 75-56-9.
- 5.14 **Propionaldehyde**, CAS No. 123-38-6.
- 5.15 **Acrolein**, CAS No. 107-02-8.
- 5.16 **Acetone**, CAS No. 67-64-1.
- 5.17 **iso-Octane**, CAS No. 540-84-1.
- 5.18 **Benzene**, CAS No. 71-43-2.
- 5.19 **Ethylene glycol monomethyl ether**, CAS No. 109-86-4.
- 5.20 **1, 2-Dichloropropane**, CAS No. 78-87-5.
- 5.21 **n-Octane**, CAS No. 111-65-9.
- 5.22 **Ethylene glycol**, CAS No. 107-21-1.

1) CAS Registry Number® is a trademark of CAS corporation. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

5.23 **1-Methoxy-2-propanol**, CAS No. 107-98-2.

5.24 **1, 2-Propylene glycol**, CAS No. 57-55-6.

5.25 **Ethylbenzene**, CAS No. 100-41-4.

5.26 **1, 3-Propanediol**, CAS No. 504-63-2.

5.27 **iso-Propylbenzene**, CAS No. 98-82-8.

5.28 **Hydrogen**, CAS No. 1333-74-0, with volume fraction of no less than 99,99 %, being dried and purified by silica gel or molecular sieve.

5.29 **Nitrogen**, CAS No. 7727-37-9, with volume fraction of no less than 99,99 %, being dried and purified by silica gel or molecular sieve.

5.30 **Air**, CAS No. 132259-10-0, oil-free, being dried and purified by silica gel or molecular sieve.

6 Apparatus

The usual laboratory apparatus and, in particular, the following shall be used.

6.1 **Gas Chromatograph (GC)**, equipped with a flame ionization detector (FID) and a split injecting device. The chromatographic peak shall reach at least twice or more the instrument noise height, without exceeding the allowable value of chromatographic column analysis.

6.2 **Recording system**, chromatographic workstation.

6.3 **Microinjector or autosampler**, 5 μL or 10 μL .

7 Sampling

Safety precautions shall conform to ISO 3165:1976, 3.3. For additional information on safety, see ISO 3170:2025, Clause 4. To obtain representative samples, sampling shall be carried out in accordance with ISO 3170:2025, Clauses 5 and 8. It is also recommended to adopt some equipment specified in ISO 3170:2025, 6.4 and 6.5, as best practices.

8 Procedure

8.1 Preparation of apparatus

Recommended chromatographic columns are shown in [Table 1](#). Chromatographic column A and B are arrayed in series by a stainless steel or glass connector with column A connected to the injector and column B connected to the detector. Adjust the instrument to the recommended conditions described in [Table 1](#), allowing sufficient time for the equipment to reach equilibrium that is indicated by a stable horizontal baseline.

Other columns and/or operating conditions that will achieve the same separation efficiency can also be used.