

Ambient air — Determination of total non-methane organic compounds — Cryogenic preconcentration and direct flame ionization detection method

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Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii to v, a blank page, pages 1 to 21 and a back cover.

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

International Standard ISO 14965 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 3, *Ambient atmospheres*.

Annex A of this International Standard is for information only.

Introduction

Accurate measurements of ambient concentrations of total non-methane volatile organic compounds (NMVOC) are important for the control of photochemical smog because these organic compounds are primary precursors of atmospheric ozone and other oxidants.

The NMVOC concentrations typically found at urban sites may range up to 1 ppmC to 3 ppmC (see definition 3.4) or higher. In order to determine transport of precursors into an area, measurement of NMVOC upwind of the area may be necessary. Rural NMVOC concentrations originating from areas free from NMVOC sources are likely to measure less than a few tenths of 1 ppmC.

Conventional methods that depend on gas chromatography and qualitative and quantitative species evaluation are excessively difficult and expensive to operate and maintain. The method described in this International Standard involves a simple, cryogenic preconcentration procedure with subsequent direct detection with the flame ionization detector (FID). The method is sensitive and provides accurate measurements of ambient total NMVOC concentrations where species data are not required.

This International Standard is intended for analysis of air samples from sampling canisters and has not been designed for continuous ambient air monitoring.

Another application of this International Standard is the monitoring of the cleanliness of canisters and screening of canister samples prior to analysis.

Collection of ambient air samples in pressurized canisters provides the following advantages:

- convenient integration of ambient samples over a specific time period;
- capability of remote sampling with subsequent central laboratory analysis;
- ability to ship and store samples, if necessary;
- analysis of samples from multiple sites with one analytical system;
- collection of replicate samples for assessment of measurement precision;
- specific hydrocarbon analysis may be performed with the same sample system.

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1 Scope

This International Standard describes a procedure for sampling and determining concentrations of total non-methane volatile organic compounds (NMVOC) in the ambient atmosphere.

This International Standard describes the collection of cumulative samples in passivated stainless steel canisters and subsequent laboratory analysis. It describes a procedure for sampling in canisters at final pressures above atmospheric pressure (referred to as pressurized sampling). It employs a cryogenic trapping procedure for concentration of the NMVOC prior to analysis.

This International Standard describes the determination of the NMVOC by simple flame ionization detection (FID), without the gas chromatographic columns and complex procedures necessary for species separation.

This International Standard is applicable to carbon concentrations in the range from 20 ppbC to 10 000 ppbC. See 12.4 for procedures for lowering the range.

Several variations to the method described in this International Standard are also possible; see clause 12.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/TR 4227:1989, *Planning of ambient air quality monitoring*.

ISO 6141:2000, *Gas analysis — Requirements for certificates for gases and gas mixtures*.

ISO 6145-1:1986, *Gas analysis — Preparation of calibration gas mixtures — Dynamic volumetric methods — Part 1: Methods of calibration*.

ISO 6145-3:1986, *Gas analysis — Preparation of calibration gas mixtures — Dynamic volumetric methods — Part 3: Periodic injections into a flowing gas stream*.

ISO 6145-4:1986, *Gas analysis — Preparation of calibration gas mixtures — Dynamic volumetric methods — Part 4: Continuous injection methods*.

ISO 6145-6:1986, *Gas analysis — Preparation of calibration gas mixtures — Dynamic volumetric methods — Part 6: Sonic orifices*.