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Stationary source emissions — Determination of the mass concentration of carbon monoxide, carbon dioxide and oxygen in flue gas — Performance characteristics of automated measuring systems

Émissions de sources fixes — Détermination de la concentration de monoxyde de carbone, de dioxyde de carbone et d'oxygène — Caractéristiques de fonctionnement et étalonnage de systèmes automatiques de mesure

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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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 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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 1, *Stationary source emissions*.

This second edition cancels and replaces the first edition (ISO 12039:2001), which has been technically revised. The main changes compared to the previous edition are as follows:

— The structure and the components are changed to be similar to the latest ISO standards; ISO 17179 (measurement of NH_3), ISO 13199 (measurement of total VOC), ISO 25140 (measurement of CH_4), ISO 21258 (measurement of N_2O) and others.

— Addition or deletion and change in terms and definitions.

— Addition of a new analytical technique (tuneable laser spectroscopy) for in-situ measurement of CO, CO_2 and O_2

— The performance characteristics and criteria as well as QA/QC procedures are changed to harmonize with latest ISO standards.

— Examples of performance test results and the results of uncertainty calculation are shown for CO, CO_2 and O_2 measurement.

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.

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Introduction

Carbon monoxide, carbon dioxide, and oxygen are gases found in the exhaust gases of combustion processes. Determination of the concentration of these gases is necessary to demonstrate compliance with local regulations and can assist the operator in the optimization of the combustion process. The determination of O_2 and/or CO_2 is also necessary to normalize the measured concentration of other gases and dusts to defined conditions. There are a number of ways to measure concentrations of CO, CO_2 and O_2 in stacks/ducts.

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Stationary source emissions — Determination of the mass concentration of carbon monoxide, carbon dioxide and oxygen in flue gas — Performance characteristics of automated measuring systems

1 Scope

This document specifies the fundamental structure and the most important performance characteristics of automated measuring systems for carbon monoxide (CO), carbon dioxide (CO_2) and oxygen (O_2) to be used on stationary source emissions. This document describes methods and equipment for the measurement of concentrations of these gases.

The method allows continuous monitoring with permanently installed measuring systems of CO, CO_2 and O_2 emissions. This international standard describes extractive systems and in situ (non-extractive) systems in connection with analysers that operate using, for example, the following principles:

— infrared absorption (CO and CO_2);

— paramagnetism (O_2);

— zirconium oxide (O_2);

— electrochemical cell (O_2);

— tuneable laser spectroscopy (TLS) (CO, CO_2 and O_2).

Other instrumental methods can be used provided they meet the minimum requirements proposed in this document.

Automated measuring systems (AMS) based on the principles above have been used successfully in this application for measuring ranges which are described in Annex G.

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 14956, *Air quality — Evaluation of the suitability of a measurement procedure by comparison with a required measurement uncertainty*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
analyser
analytical part in an extractive or *in situ AMS* (3.3)

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