

INTERNATIONAL STANDARD

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Stationary source emissions — Determination of the mass concentration of nitrogen oxides — Performance characteristics of automated measuring systems

*Émissions de sources fixes — Détermination de la concentration en
masse des oxydes d'azote — Caractéristiques de performance des
systèmes de mesurage automatiques*



Reference number
ISO 10849:1996(E)

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.

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.

International Standard ISO 10849 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 1, *Stationary source emissions*.

Annex A forms an integral part of this International Standard. Annexes B and C are for information only.

Introduction

Nitrogen oxides are produced during most combustion processes. In fossil fuel combustion, nitrogen oxides are produced from nitrogen combined in the fuel and from the oxidation of nitrogen in the air used for combustion. The quantity of nitrogen oxides produced depends upon the nitrogen content of the fuel, the boiler design, the burner design and the boiler operating conditions.

In flue gases from conventional combustion systems, the nitrogen oxides consist of approximately 95 % nitrogen monoxide (NO). The remaining oxide is predominantly nitrogen dioxide (NO₂) formed from the oxidation of NO when the flue gas temperature decreases. These two oxides (NO + NO₂) are generally designated as NO_x. It should be noted that in other processes the ratio of NO to NO₂ may be different and other nitrogen oxides may be present.

There are numerous ways of determining nitrogen oxides in the gases of combustion plants, both wet chemical/analytical methods and instrumental techniques.

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Stationary source emissions — Determination of the mass concentration of nitrogen oxides — Performance characteristics of automated measuring systems

1 Scope

This International Standard specifies the fundamental structure and the most important performance characteristics of automated measuring systems for oxides of nitrogen to be used on stationary source emissions, for example combustion plants. The procedures to determine the performance characteristics are also specified. Furthermore, it describes methods and equipment to determine NO or NO_x (NO + NO₂) in flue gases including the sampling system and sample gas conditioning system. Dinitrogen monoxide (N₂O) is not determined by the methods described in this International Standard. The given performance characteristics refer to the complete measuring system, from sampling to analyser.

This International Standard describes extractive and non-extractive systems in connection with a range of analysers that operate using, for example, the following principles:

- chemiluminescence;
- non-dispersive infrared spectroscopy;
- non-dispersive ultraviolet spectroscopy;
- differential optical absorption spectrometry.

NOTE 1 Commercial devices using the described techniques, that meet the requirements of this International Standard, are available.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publi-

cation, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6879:1995, *Air quality — Performance characteristics and related concepts for air quality measuring methods*.

ISO 7996:1985, *Ambient air — Determination of the mass concentration of nitrogen oxides — Chemiluminescence method*.

ISO 8096:1992, *Stationary source emissions — Determination of concentration and mass flow rate of particulate material in gas-carrying ducts — Manual gravimetric method*.

ISO 9169:1994, *Air quality — Determination of performance characteristics of measurement methods*.

ISO 10396:1993, *Stationary source emissions — Sampling for the automated determination of gas concentrations*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 automated measuring system (AMS): System that may be attached to a chimney to continuously measure and record the mass concentration of nitrogen oxides passing through the chimney.

3.2 analyser: Analytical part in an extractive AMS.