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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 146, *Air quality*, Subcommittee SC 1, *Stationary source emissions*.

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

Ammonia emissions arise to a large extent from agriculture. Industries such as chemical production processes (e.g. fertilizer production plants) emit ammonia as well as power plants, cement factories and waste incineration plants with SCR and non-SCR reactors with ammonia slip. The ammonia emissions are measured and often controlled by legislation.

This document specifies an independent method of measurement for intermittent monitoring of ammonia emissions as well as for the calibration and validation of automated ammonia measuring systems.

This document can be used in conjunction with ISO 17179 which specifies performance characteristics of automated measuring systems (AMS) for the determination of the mass concentration of ammonia in waste gas. According to ISO 17179, permanently installed AMS for continuous monitoring of ammonia emissions are calibrated and validated by comparison with an independent method of measurement. The uncertainty of measured values obtained by permanently installed AMS for continuous monitoring are determined by comparison measurements with an independent method of measurement as part of the calibration and validation of the AMS. This ensures that the measurement uncertainty is representative of the emission at a specific plant.

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Stationary source emissions — Determination of the mass concentration of ammonia — Manual method

1 Scope

This document specifies a manual method of measurement including sampling and different analytical methods for the determination of the mass concentration of ammonia (NH_3) in the waste gas of industrial plants, for example combustion plants or agricultural plants. All compounds which are volatile at the sampling temperature and produce ammonium ions upon dissociation during sampling in the absorption solution are measured by this method, which gives the volatile ammonia content of the waste gas.

This document specifies an independent method of measurement, which has been validated in field tests in a NH_3 concentration range of approximately 8 mg/m^3 to 65 mg/m^3 at standard conditions. The lower limit of the validation range was determined under operational conditions of a test plant. The measurement method can be used at lower values depending, for example, on the sampling duration, sampling volume and the limit of detection of the analytical method used.

NOTE 1 The plant, the conditions during field tests and the performance characteristics obtained in the field are given in [Annex A](#).

This method of measurement can be used for intermittent monitoring of ammonia emissions as well as for the calibration and validation of permanently installed automated ammonia measuring systems.

NOTE 2 An independent method of measurement is called standard reference method (SRM) in EN 14181.

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 7150-1, *Water quality — Determination of ammonium — Part 1: Manual spectrometric method*

ISO 11732, *Water quality — Determination of ammonium nitrogen — Method by flow analysis (CFA and FIA) and spectrometric detection*

ISO 14911, *Water quality — Determination of dissolved Li^+ , Na^+ , NH_4^+ , K^+ , Mn^{2+} , Ca^{2+} , Mg^{2+} , Sr^{2+} and Ba^{2+} using ion chromatography — Method for water and waste water*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>