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Stationary source emissions — Determination of the mass concentration of sulfur dioxide — Hydrogen peroxide/barium perchlorate/Thorin method

*Émissions de sources fixes — Détermination de la concentration en masse de
dioxyde de soufre — Méthode au peroxyde d'hydrogène/perchlorate de
baryum/Thorin*



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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7934 was prepared by Technical Committee ISO/TC 146, *Air quality*.

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International Organization for Standardization

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Stationary source emissions — Determination of the mass concentration of sulfur dioxide — Hydrogen peroxide/barium perchlorate/Thorin method

1 Scope

This International Standard specifies a hydrogen peroxide/barium perchlorate/Thorin¹⁾ method for the determination of the mass concentration of sulfur dioxide emitted from combustion facilities and technical processes with negligible amounts of sulfur trioxide and sulfuric acid. It is applicable from a minimum of 30 mg/m³ sulfur dioxide by reference to sampling periods of normally 30 min.

At mass concentrations of sulfur dioxide greater than 2 000 mg/m³, the volume of the waste gas under investigation passed through the sampling train is 30 litres.

Substances, which, if contained in the waste gas under investigation and thus in the waste gas sample, are known to have an effect on the titration reading, are given in 7.4. Information on performance characteristics is given in 8.2.

At mass concentrations of sulfur dioxide less than 30 mg/m³, a sampling period greater than that specified in this International Standard is used.

All concentrations are based on dry gas at a temperature of 273,1 K and a pressure of 101,3 kPa.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, 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 3696 : 1987, *Water for analytical laboratory use — Specification and test methods*.

ISO 6879 : 1983, *Air quality — Performance characteristics and related concepts for air quality measuring methods*.

3 Principle

Absorption of the sulfur dioxide present in the waste gas sample passing through a hydrogen peroxide solution within a specified period, resulting in the formation of sulfuric acid solution.

Adjustment of the pH of the sample solution to pH 3,5 with sodium hydroxide solution or perchloric acid solution as required. Determination of the mass concentration of sulfate ions present in the treated sample solution by titration with a barium perchlorate solution using Thorin as indicator and calculation of the mass concentration of sulfur dioxide.

4 Reagents

During the analysis use only reagents of recognized analytical grade and only water of at least grade 3 purity according to ISO 3696.

WARNING — Use the reagents in accordance with the appropriate health and safety regulations.

4.1 Propan-2-ol [CH₃CH(OH)CH₃].

4.2 Absorption solution.

Place 100 ml of a 27 % (m/m) to 30 % (m/m) solution of hydrogen peroxide (H₂O₂) into a 1 000 ml one-mark volumetric flask. Make up to the mark with water and mix well.

Prepare this solution on the day of use.

4.3 Barium perchlorate, standard volumetric solution, c[Ba(ClO₄)₂] = 0,005 mol/l.

Use a commercially available barium perchlorate solution of defined concentration or, if this is not possible, prepare for example as follows.

1) Thorin is also known as Thoron or Thoronol, the sodium salt of 4-[(2-arsenophenyl)-azo]-3-hydroxy-2,7-naphthalene-disulfonic acid.