



BS 6069 : Section 4.1 : 1990
ISO 7934 : 1989

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British Standard

Characterization of air quality

Part 4. Stationary source emissions

Section 4.1 Method for the determination of the
mass concentration of sulphur dioxide: Hydrogen
peroxide/barium perchlorate/Thorin method

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National foreword

This Section of BS 6069 has been prepared under the direction of the Environment and Pollution Standards Policy Committee and is identical with ISO 7934 : 1989 'Stationary source emissions — Determination of the mass concentration of sulfur dioxide — Hydrogen peroxide/barium perchlorate/Thorin method'. The international standard was prepared by *Technical Committee 146, Air quality, of the International Organization for Standardization (ISO)* with the active participation and approval of the UK.

BS 6069 is being published in a series of Parts and Sections that will generally correspond to particular international standards arising from the UK participation in the work of ISO/TC 146. This Section of BS 6069 is one of several relating to stationary source emissions that are being published as Sections of Part 4. Methods concerning workplace atmospheres are being published as Sections of Part 3 of BS 6069. Topics relating to other aspects of air quality characterization will be published as further Parts or Sections of BS 6069.

The following Parts of BS 6069 have already been published:

- Part 1 Units of measurement
- Part 2 Glossary

Methods for the determination of particular constituents of ambient air are being published as Parts of BS 1747 'Methods for the measurement of air pollution'.

Cross-reference

| International standard | Corresponding British Standard |
|------------------------|---|
| ISO 3696 : 1987 | BS 3978 : 1978 Specification for water for laboratory use (Identical) |

Reference to ISO 6879 is only made in the footnote to 8.2.1 concerning the definition for 'lower detection limit'. The definition of this term in ISO 6879 is as follows.

Lower detection limit: Smallest value of the air quality characteristic which, with 95 % ¹⁾ probability, can be distinguished from a zero sample.

NOTE — A zero sample has 5 % ¹⁾ probability of causing a reading above the lower detection limit. When the value of air quality characteristic is at the lower detection limit, 50 % of the results will be measured as zero under the assumption that the distribution is symmetric.

Additional information. Further information on the sampling of flue gases (stationary source emissions) may be found in BS 1756 : Part 1 : 1971. A British Standard based on an ISO standard is under development on this subject.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

¹⁾By convention.

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-arsonophenyl)-azo]-3-hydroxy-2,7-naphthalene-disulfonic acid.