



Withdrawn

Gas analysis — Determination of sulphur dioxide — Part 1 : General guidance for the choice of methods

Analyse des gaz — Dosage du dioxyde de soufre — Partie 1 : Directives pour le choix des méthodes

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0 Introduction

This Technical Report constitutes the first part of a future International Standard concerning the determination of sulphur dioxide in gases. Each of the other parts will describe in detail one of the methods of determination.

Pending finalization of a certain number of parts describing the available methods for the determination of sulphur dioxide, it was considered preferable to publish this first part, which gives a rapid comparison of the methods, as a Technical Report. This type of publication will better draw the attention of users to the fact that further studies are being carried out on methods for the determination of sulphur dioxide.

1 Scope and field of application

This Technical Report gives a non-exhaustive list of methods that can be used to determine the sulphur dioxide content of gases and explains a certain number of analytical criteria, pertaining to each of them, in order to enable users to select judiciously the method for the application being considered.

The user should understand, however, that the criteria given in this Technical Report are not sufficient to perform the analysis and reference should be made to the specific part of the International Standard which describes in detail the particular method chosen.

2 Available methods

The various methods of analysis compared in clause 3 are the following :

- non-dispersive infrared absorption;
- infrared spectrometry using cells of long path length;
- gas chromatography, with detection by catharometry or flame photometry;
- colorimetry using pararosaniline;

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- electrical conductimetry;
- coulometry;
- detector tubes;
- flame photometry;
- mass spectrometry;
- ion-specific electrode;
- electrochemical cell : coulometry using a membrane;
- non-dispersive ultraviolet absorption;
- ultraviolet fluorescence;
- correlation spectrometry;
- second derivative spectrometry;
- measurement of gaseous acid pollution index.

Other methods for the determination of sulphur dioxide are available but are not considered here.

3 Comparison of characteristics of the methods

The fourteen characteristics given below have been chosen to enable a comparison to be made between the methods considered. However, there are other characteristics of the analytical methods that the user should take into account when considering the determination.

Characteristics 1 to 11 are presented in tabular form for easy and rapid comparison. Characteristics 12 to 14, which require longer explanations, are described in clause 4.

The characteristics mentioned in the table are only given for guidance as they depend upon a number of particular measuring conditions which cannot be taken into consideration in this general document which has to be concise to enable a first rapid comparison of the methods.

The list of characteristics considered is as follows :

- 1 — Detection threshold¹⁾²⁾
- 2 — Maximum measurable concentration²⁾
- 3 — Nature of output signal
- 4 — Response time (or analysis time for a discontinuous method)
- 5 — Repeatability (as a relative value)³⁾
- 6 — Possibility of re-use of the sample
- 7 — Method of measurement : automatic or manual⁴⁾

1) The **detection threshold** is a purely qualitative concept defined as follows : The smallest variation of the sample concentration of the gas being analysed which produces a significant change in the output signal.

This should not be confused with **measuring threshold** for which the value is related to repeatability and can be close to the detection threshold.

2) Values in columns 1 and 2 of the table are not correlated and generally cannot both be obtained with the same set of operational conditions.

3) The value indicated gives only an order of magnitude of repeatability for usual measuring conditions.

4) The characteristics given in the other columns of the table correspond to the automatic or manual method (that considered is underlined if both are mentioned). Automatic refers to a method in current use where one or more of the steps are automated.