

ICS 13.220.40

CCS C 80



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 38309-2019

**Toxicity testing of fire effluents - Guidance for analysis of gases
and vapours in fire effluents using FTIR gas analysis**

Issued on: December 10, 2019

Implemented on: April 1, 2020

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Foreword

Introduction

1 Scope

2 Normative references

3 terms and definitions

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses redrafting method to modify and adopt ISO 19702..2015 "Fire Smoke Toxic Component Test FTIR Analysis of Fire Smoke

Guidelines for gas components in gas. Compared with ISO 19702..2015, this standard has more structural adjustments. The standard is listed in Appendix A.

Checklist with ISO 19702..2015 chapter numbers.

There are technical differences between this standard and ISO 19702..2015. The terms related to these differences have passed through the margins on the outer margins.

The installed vertical single line (|) is marked, and a list of the technical differences and reasons between this standard and ISO 19702..2015 is given in Appendix B.

This standard also makes the following editorial changes.

--- deleted references;

--- Added informative appendix A and informative appendix B.

This standard was proposed by the Ministry of Emergency Management of the People's Republic of China.

This standard is under the jurisdiction of the National Fire Standardization Technical Committee (SAC/TC113).

This standard was drafted. Sichuan Fire Research Institute of Emergency Management Department, Jiangsu Fire Rescue Corps, Beijing Fire Rescue Corps.

Introduction

The composition of fire smoke is complex, and chemical reactions are easy to occur with each other. The concentration of fire smoke changes greatly in space and time in a short

time.

When analyzing the composition of the flue gas, it is required that its testing means have high sensitivity and selectivity.

Fourier transform infrared spectroscopic gas analysis (FTIR) has the following characteristics that distinguish it from other technologies.

- Can detect multiple gas components;
- Can monitor the change of smoke component concentration with time during the fire;
- If a new component that plays an important role in toxicity is found in the experimental test, the spectrum of the component can be collected from the historical records information.

This standard specifies the sampling of fire smoke components using FTIR analysis in small, medium and large fire tests.

The composition of the system, the spectral resolution, the requirements for the collection and calibration of the spectrum, and the applicable range of the analysis method are also given.

Fire smoke stream toxic component test

Guidelines for FTIR Analysis of Gas Components in Fire Smoke

1 Scope

This standard specifies the use of Fourier transform infrared spectroscopic gas analysis technology (FTIR) to analyze carbon monoxide (CO),

Carbon oxide (CO₂), hydrogen cyanide (HCN), hydrogen chloride (HCl), hydrogen bromide (HBr), nitrogen monoxide (NO), nitrogen dioxide (NO₂), and acrolein (CH₂CHCHO) and other gas components.

This standard applies to the concentration analysis of various gas components in fire smoke, and also applies to other gases that can be analyzed by FTIR technology.

Includes hydrogen fluoride (HF) and sulfur dioxide (SO₂).

2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this article

Pieces. For undated references, the latest version (including all amendments) applies to this document.

ISO 19701..2013 Methods for Sampling and Analysis of Fire Smoke (Methods for sampling and analysis of fire effluents)

3 terms and definitions

The following terms and definitions apply to this document.

3.1

Fourier transform infra-red spectroscopy gas analysis; FTIR

An infrared spectroscopy technique that uses mathematically calculated Fourier transform to measure the concentration of multi-component gases.

3.2

Resolution

The ability of a spectrometer to resolve two adjacent frequencies (or wavenumbers) requires that the interval between two bands be at least one of the bands

Half.

3.3

Wavenumber

The reciprocal of the wavelength.

Note. The unit is per centimeter (cm^{-1}).

3.4

Minimum detection limit

LD

The minimum concentration of a substance to be tested can be detected from a sample within a given degree of reliability.

Note. Units are microliters per liter ($\mu\text{L/L}$).

3.5

Limit of quantification

LQ

The lowest concentration of the test substance in the sample that can be quantitatively determined.

Note. Units are microliters per liter ($\mu\text{L/L}$).