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

GB/T 46122.9-2025

**Fireworks - Test methods for determination of specific chemical
substances - Part 9: Determination of mercury content -
Hydride generation atomic fluorescence spectrometry**

烟花爆竹 特定化学物质检测方法 第9部分：汞含量的测定 氢化物发生-原子荧光
光谱法

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 9 of GB/T 46122 "Test Methods for Specific Chemical Substances in Fireworks and Firecrackers". GB/T 46122 has been published.

The following parts were included.

---Part 1: General Provisions;

---Part 2: Determination of Hexachlorobenzene Content by Gas Chromatography;

---Part 3: Determination of Lead and Lead Compound Content by Flame Atomic Absorption Spectrometry;

---Part 4: Determination of Lead and Lead Compound Content by X-ray Fluorescence Spectrometry;

---Part 5: Determination of Lead and Lead Compound Content by Inductively Coupled Plasma Atomic Emission Spectrometry;

---Part 6: Determination of Zirconium Content in Particles Smaller than 40 µm by Inductively Coupled Plasma Atomic Emission Spectrometry;

---Part 7: Determination of Chlorate Content by Chemical Titration Analysis;

---Part 8: Determination of Arsenic Content by Hydride Generation-Atomic Fluorescence Spectrometry;

---Part 9: Determination of Mercury Content by Hydride Generation-Atomic Fluorescence Spectrometry;

---Part 10: Determination of Nitrogen Content in Nitrocellulose by Ferrous Sulfate Titration;

---Part 11: Determination of Phosphorus Content by Inductively Coupled Plasma Atomic Emission Spectrometry;

---Part 12: Determination of picric acid and picrate content by high performance liquid chromatography.

This document is equivalent to ISO 22863-9:2021 "Fireworks and firecrackers - Specific chemical substances - Determination - Part 9: Hydride generation -Determination of mercury content by atomic fluorescence spectrometry.

The following minimal editorial changes have been made to this document.

---To harmonize with existing standards, the standard name has been changed to "Test Methods for Specific Chemical Substances in Fireworks and Firecrackers - Part 9: Mercury Content" Determination of hydride generation-atomic fluorescence spectrometry.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China National Light Industry Council.

This document is under the jurisdiction of the National Technical Committee on Standardization of Fireworks and Firecrackers (SAC/TC149).

Introduction

With increasing emphasis on the safety and environmental protection of fireworks and firecrackers, attention is being paid to the chemical substances used in these products.

Requirements were established, particularly regarding restrictions on the use of toxic, hazardous, and chemical substances that increase the flammability and explosion hazard of products. International Standards the Technical Committee on Fireworks and Firecrackers of the United Nations organized the development of ISO 22863 (all parts). GB/T 46122 adopts ISO 22863 (all parts).

The standardization and normalization of testing methods for fireworks and firecrackers is

aimed at improving the safety and environmental performance of fireworks and firecrackers and promoting industrial development.

This is the foundational work. GB/T 46122 is planned to consist of 12 parts.

---Part 1: General Principles. The purpose is to determine the methods for specimen dissection, sampling, and sample preparation.

---Part 2: Determination of Hexachlorobenzene Content by Gas Chromatography. The purpose is to determine the hexachlorobenzene content in fireworks and firecrackers.

The methods, procedures, and results descriptions.

---Part 3: Determination of Lead and Lead Compound Content by Flame Atomic Absorption Spectrometry. The aim is to determine the appropriate method for determining the content of lead and lead compounds using flame atomic absorption spectrometry.

This paper describes the method, procedure, and results for determining the content of lead and lead compounds in fireworks and firecrackers using spectrophotometry.

---Part 4: Determination of Lead and Lead Compound Content by X-ray Fluorescence Spectroscopy. The aim is to determine the content of lead and lead compounds using X-ray fluorescence spectroscopy.

The method, procedure, and results of spectroscopic determination of lead and lead compound content in fireworks and firecrackers are described.

---Part 5: Determination of Lead and Lead Compound Content by Inductively Coupled Plasma Atomic Emission Spectrometry. The aim is to determine the content of lead and lead compounds.

Methods, procedures, and results for determining lead and lead compound content in fireworks and firecrackers using inductively coupled plasma atomic emission spectrometry.

The result is expressed.

---Part 6: Determination of Zirconium Content in Particles Smaller than 40 μm by Inductively Coupled Plasma Atomic Emission Spectrometry. The aim is to determine...

A method for determining the zirconium content (particle size less than 40 μm) in fireworks and firecrackers using inductively coupled plasma atomic emission spectrometry.

Procedure and result description.

---Part 7: Determination of Chlorate Content by Chemical Titration Analysis. The purpose is to determine the appropriate chemical titration method for determining chlorate content in fireworks.

Methods, procedures, and results description for determining chlorate content in firecrackers.

---Part 8: Determination of Arsenic Content by Hydride Generation-Atomic Fluorescence Spectrometry. The aim is to determine the arsenic content using hydride generation-atomic fluorescence spectrometry.

The method, procedure, and results of determining the arsenic content in fireworks and firecrackers by fluorescence spectroscopy are described.

---Part 9: Determination of Mercury Content by Hydride Generation-Atomic Fluorescence Spectrometry. The aim is to determine the method for determining mercury content using hydride generation-atomic fluorescence spectrometry.

The method, procedure, and results of determining mercury content in fireworks and firecrackers by fluorescence spectroscopy are described.

---Part 10: Determination of Nitrogen Content in Nitrocellulose by Ferrous Sulfate Titration. The aim is to determine the method of using ferrous sulfate titration...

This document describes the methods, procedures, and results for determining the nitrogen content in nitrocellulose in fireworks and firecrackers.

---Part 11: Determination of Phosphorus Content by Inductively Coupled Plasma Atomic Emission Spectrometry. The aim is to determine the appropriate method for determining phosphorus content using inductively coupled plasma atomic emission spectrometry.

The method, procedure, and results of determining phosphorus content in fireworks and firecrackers by plasma atomic emission spectrometry are described.

---Part 12: Determination of Picric Acid and Picrate Content by High Performance Liquid Chromatography. The aim is to determine the appropriate method for determining the content of picric acid and picrates using high performance liquid chromatography.

The method, procedure, and results of spectroscopic determination of picric acid and picrate content in fireworks and firecrackers are described.

Detection methods for specific chemical substances in fireworks and firecrackers Part 9: Determination of Mercury Content Hydride generation-atomic fluorescence spectrometry

1 Scope

This document describes a method for determining the mercury content in specific chemicals in fireworks and firecrackers using hydride generation-atomic fluorescence spectrometry.

This document applies to the determination of mercury content in fireworks and firecrackers by hydride generation-atomic fluorescence spectrometry.