ICS 73.040
CCS D21

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 43220-2023

Determination of arsenic in solid biofuels

固体生物质燃料中砷的测定方法

Issued on: September 7, 2023 **Implemented on: April 1, 2024**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

Table of Contents

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. Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents. This document is proposed by the China Coal Industry Association. This document is under the jurisdiction of the National Coal Standardization Technical Committee (SAC/TC42). This document was drafted by: Coal Testing Center of Coal Science and Technology Research Institute Co., Ltd. The main drafters of this document. Chen Huizhu, Fu Kun, and Chen Sihan. Method for determination of arsenic in solid biomass fuels

1 Scope

GB/T 43220-2023 gives the methods for determining arsenic in solid biofuels. Biomass pellets are burned as a coal substitute, and the assumption behind that substitution is that what comes out of the stack is cleaner - which fails if the feedstock is contaminated. Arsenic is the case that matters most: it enters the fuel through demolition wood treated with copper chrome arsenate and through crop residues grown on contaminated soil, it volatilises in combustion, and it is not removed by the controls a biomass boiler typically has. The standard gives two methods, hydride generation atomic fluorescence spectrometry and hydride generation atomic absorption spectrometry, then the calculation and presentation of the results, the precision of the methods and the test report, with an informative annex giving the reference instrument operating conditions. It took effect on 1 April 2024.

This document describes the hydride generation-atomic fluorescence spectrometry and

hydride generation-atomic absorption methods for the determination of arsenic in solid biomass fuels. Method summary, reagents and materials, instruments and equipment, samples, test procedures, result calculation and presentation, method precision and test report. This document applies to the determination of arsenic in solid biomass fuels.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document.

GB/T 622 Chemical reagent hydrochloric acid

GB/T 623 Chemical reagent perchloric acid

GB/T 625 Chemical Reagent Sulfuric Acid

GB/T 626 Chemical reagent nitric acid

GB/T 6682 Specifications and test methods for water used in analytical laboratories

GB/T 6684 Chemical reagent 30% hydrogen peroxide

GB/T 15337 General principles of atomic absorption spectrometry

GB/T 21191 Atomic Fluorescence Spectrometer

GB/T 21923 General rules for inspection of solid biomass fuel

GB/T 26814 Microwave digestion device

GB/T 28730 Solid biomass fuel sample preparation method

3 Terms and definitions

The terms and definitions defined in GB/T 21923 apply to this document.

4 Hydride generation-atomic fluorescence spectrometry

4.1 Summary of methods After the solid biomass fuel is digested by microwave digestion, wet digestion or Ashka mixed burning method, a pre-reducing agent is added to reduce the pentavalent arsenic. into trivalent arsenic, and use sodium borohydride to reduce the trivalent arsenic to gaseous hydride. Argon is used as a carrier gas to introduce the gaseous hydride obtained by reduction into atoms. In a certain concentration range, the fluorescence intensity is directly proportional to the arsenic content. The arsenic content in the solution can be measured by comparing with the standard series.

4.2 Reagents and materials Warning. The strong acid used in the test is highly corrosive and oxidizing. Protective equipment must be worn during operation and avoid contact with skin and clothing. All The sample pretreatment process needs to be carried out in a fume hood. Unless otherwise stated, chemical reagents of analytical grade and above that comply with national standards are used in the analysis, and the water used is in compliance with GB/T 6682 regulations.