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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 33352-2024

Replacing GB/T 33352-2016

General rules of screening application of restricted substances in electrical and electronic products-X-Ray fluorescence spectrometry

电子电气产品中限用物质筛选应用通则 X射线荧光光谱法

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Standardization Administration of the PRC

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Foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting:

This document replaces GB/T 33352-2016 "General Rules for Application of Screening of Restricted Substances in Electronic and Electrical Products - X-ray Fluorescence Spectrometry" and Compared with GB/T 33352-2016, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

- Added the definition, requirements and verification methods of correctness (see 3:16 and 5:5:5);

- Changed the verification test method of the detection limit indicator, directly citing the relevant method in GB/T 31364-2015 (see 5:5:4,:2016 Version A:2:2);

- Changed the verification test method of energy resolution index, directly citing the relevant method in GB/T 31364-2015 (see 5:5:6, 5:5 of the:2016 edition);

- Added the spot position requirement of X-ray spot less than 3mm [see 5:5:9b)];

- Deleted the normative appendix A, and put the two performance index requirements of precision and detection limit and the relevant contents of verification method into the main text (see 5:5:3 and 5:5:4):

Please note that some of the contents of this document may involve patents: The issuing organization of this document does not assume the responsibility for identifying patents:

This document was proposed and coordinated by the National Technical Committee for Environmental Standardization of Electrical and Electronic Products and Systems (SAC/TC297):

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This document was first published in:2016 and this is the first revision:

Introduction

The widespread use of electronic and electrical products has made people more concerned about their impact on the environment: Many countries or regions in the world have enacted special laws and regulations:

Regulations restrict the use of certain hazardous substances in electrical and electronic products:

In order to ensure that restricted substances comply with regulatory requirements, manufacturers of electronic and electrical products need to test the materials of their products:

Fluorescence spectroscopy (hereinafter referred to as XRF) is a fast, low-cost, easy-to-operate and even non-destructive method for quantitative or semi-quantitative analysis of electronic and electrical products:

The test method for screening restricted substances in products is widely used by relevant enterprises and third-party testing institutions, and its test results are widely used in Nevertheless, stakeholders should still pay attention to:

a) Since XRF cannot obtain the valence state and molecular information of the elements in the sample, it is not possible to obtain the valence state and molecular information of the elements in the sample through XRF:

Ether can only be tested for its total chromium and total bromine content;

b) The detection accuracy provided by XRF can at least reach the level of semi-quantitative analysis, that is, at the specified 68% confidence level, the measurement results The relative uncertainty of the analysis is typically 30% or better, but this is still relatively low compared to wet chemical analysis: Too big:

Considering the large performance differences between different XRF spectrometers, some XRF spectrometers have obvious differences in element selectivity and sensitivity:

In order to ensure that XRF spectrometers with different designs, different complexities and different performances can be used in electronic and electrical products, the The screening test of substances, and considering the influence of laboratory operators, environment, and management on the test results, it is necessary to use XRF spectrometer Necessary regulations are implemented to screen and test restricted substances in electrical and electronic products:

General Rules for the Screening of Restricted Substances in Electrical and Electronic

Products X-ray fluorescence spectrometry Warning 1---X-rays are harmful to the human body: XRF users should receive training on the operation of XRF spectrometers and have the operating skills:

The manufacturer's safety instructions and national health and occupational safety regulations should be followed: Operate with caution:

Warning 2---This document does not address all possible safety issues: XRF users are responsible for taking appropriate safety and health measures:

and ensure that the conditions stipulated by relevant national laws and regulations are met:

1 Scope

This document specifies the energy dispersive X-ray fluorescence spectroscopy screening test for lead (Pb), mercury (Hg), cadmium (Cd), total chromium (Cd) and other trace elements in electrical and electronic products:

Requirements for instruments, personnel technical capabilities, test procedures, quality control, documentation, etc: for elements such as chromium (Cr) and total bromine (Br):

This document applies to X-ray fluorescence of lead (Pb), mercury (Hg), cadmium (Cd), total chromium (Cr) and total bromine (Br) in electrical and electronic products:

Optical spectral screening test: This document is not suitable for testing gas samples:

The wavelength dispersive X-ray fluorescence spectroscopy screening application can be implemented as a reference:

Note: For wavelength dispersive X-ray fluorescence spectroscopy, refer to relevant standards or instrument manuals for sample preparation:

2 Normative references

GB 4793

GB 18871

GB/T 26572

GB/T 31364-2015

GB/T 39560

GB/T 39560

GB/T 39560

3 Terms and definitions