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

GB/T 21782.4-2025

Replacing GB/T 21782.4-2008

Coating powders - Part 4: Calculation of lower explosion limit

粉末涂料 第4部分：爆炸下限的计算

(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 4 of GB/T 21782 "Powder Coatings". GB/T 21782 has already published the following parts.

- Part 1: Determination of particle size distribution by sieving method;
- Part 2: Determination of density using a gas comparative hydrometer (arbitration method);
- Part 3: Determination of density using the liquid displacement specific gravity bottle method;
- Part 4: Calculation of the Lower Explosive Limit;
- Part 5: Determination of the flowability of powder-air mixtures;
- Part 7: Methods for determining mass loss during baking;
- Part 8: Assessment of the storage stability of thermosetting powders;
- Part 9: Sampling;
- Part 10: Determination of Deposition Efficiency;
- Part 11: Determination of the Flowability of Inclined Plates;

---Part 12: Determination of compatibility;

---Part 13: Particle Size Analysis by Laser Diffraction;

---Part 14: Terminology.

This document supersedes GB/T 21782.4-2008 "Powder Coatings - Part 4: Calculation of Lower Explosive Limit", and is consistent with GB/T 21782.4-Compared to 2008, aside from structural adjustments and editorial changes, the main technical changes are as follows.

---The scope has been revised, redefining the main content and applicable situations specified within it (see Chapter 1, 2008).

Chapter 1 of the edition);

---A new chapter on "Principles" has been added (see Chapter 4);

---The supporting documentation for the "Method for Determination of Total Calorific Value" has been changed to conform to domestic operational requirements; ISO 1928:1995 has been modified.

GB/T 213 (see 6.1, Chapter 5 of the 2008 edition);

---Added applicable scenarios for the total calorific value calculation method (see 6.2.1) and the assumptions of the calculation method (see 6.2.2);

---Added to the test report. Note that the results are derived from calculations of total calorific value or estimations of the calorific values of individual components; test process...

Requirements regarding observed anomalies (see Chapter 8).

This document is modified to adopt ISO 8130-4:2021 "Powder coatings - Part 4: Calculation of lower explosive limit".

This document has undergone the following structural adjustments compared to ISO 8130-4:2021.

---Sections 6.1, 6.2.1, and 6.2.2 correspond to Chapter 6 of ISO 8130-4:2021;

---6.2.3 corresponds to Formula (2) in Chapter 7 of ISO 8130-4:2021.

The technical differences between this document and ISO 8130-4:2021, and the reasons therefor, are as follows.

---The standard for "sampling" has been changed, replacing ISO 15528 with GB/T 3186, which conforms to my country's actual operational requirements (see section 5).

Chapter 5 of ISO 8130-4:2021);

---The standard for "obtaining gross calorific value" has been changed, replacing ISO 1928:1995 with GB/T 213, which is more in line with my country's actual practices.

Requirements (see 6.1, Chapter 6 of ISO 8130-4:2021).

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 and is under the jurisdiction of the National Technical Committee on Standardization of Hazardous Chemicals Management (SAC/TC251).

Introduction

The GB/T 21782 series of standards covers the testing and evaluation of key indicators of powder coatings, such as particle size distribution, density determination, and storage stability.

This series of standards defines a set of tests and applications for powder coatings. Each document in this series describes a specific set of tests and applications. The GB/T 21782 series of standards aims to provide a standard for powder coatings.

This standard provides a unified and reliable testing process for manufacturers and powder coating testers, and supports product quality control, safe production, and international standards.

Trade provides scientific support. GB/T 21782 is proposed to consist of thirteen parts.

---Part 1: Determination of Particle Size Distribution by Sieving Method. The purpose is to specify two methods, manual and mechanical sieving, for determining particle size distribution.

Particle size distribution of the final coating.

---Part 2: Determination of Density by Gas Comparative Hydrometer Method (Arbitration Method). The purpose is to define a method for determining density based on the principle of gas displacement, using gas...

A method for determining the density of powder coatings using a volumetric specific gravity meter.

---Part 3: Determination of Density by Liquid Displacement Specific Gravity Bottle Method. The purpose is to define a method for determining density based on Archimedes' principle using liquid displacement specific gravity bottles.

A method for determining the density of powder coatings using a heavy-duty bottle.

---Part 4: Calculation of the Lower Explosive Limit. The purpose is to specify the calculation method for the lower explosive limit of powder coatings based on the total calorific value or the calorific value of the combustible components.

Methods to lower the limit.

---Part 5: Determination of the flowability of powder-air mixtures. The aim is to express, by measuring the fluidization factor and powder flow rate, the flowability of powder-air mixtures.

Characterize the flow properties of powder during transport and spraying.

---Part 7: Method for determining mass loss during baking. The purpose is to specify the method for applying powder coatings using an electrostatic spraying process.

A method for measuring mass loss during the curing and baking process after substrate preparation.

---Part 8: Assessment of the Storage Stability of Thermosetting Powders. The aim is to assess the storage stability of thermosetting powder coatings by placing them in a specific storage environment.

Storage stability is assessed by observing changes in free flow properties after the product is stored at a specified temperature for a specified period of time in an environment.

---Part 9: Sampling. The purpose is to define a standard procedure for sampling from the delivery batch, and to quantitatively reduce the sample to test samples.

Technical requirements for the sample.

---Part 10: Determination of Deposition Efficiency. The purpose is to specify the deposition efficiency on test samples under known spray gun and environmental conditions.

The method for determining the percentage by mass of powder used in coating.

---Part 11: Determination of the flowability of an inclined plate. The purpose is to specify the flowability of thermosetting powder coatings when applied at a fixed angle along an inclined plate.

Methods for detecting flow characteristics during molten flow.

---Part 12: Compatibility Testing. The purpose is to define the surface properties of the final coating resulting from mixing two different powder coatings.

Methods for determining degradation.

---Part 13: Particle Size Analysis by Laser Diffraction. The purpose is to specify the method for determining the equivalent spherical particle size of powder coatings using laser diffraction.

Methods for radial distribution.

---Part 14: Terminology. The purpose is to define the concepts of powder coating, deposition rate, gelation time, etc., for the powder coating industry.

Provide a unified terminology standard.