

ICS 19.120
CCS A 28



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

GB/T 42351.2-2024

**Preparation of particulate reference materials - Part 2:
Polydisperse spherical particles**

颗粒标准样品的制备 第2部分：多分散球形颗粒

(English Translation)

Issued on: September 29, 2024

Implemented on: April 1, 2025

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

Table of Contents

Preface	
Introduction	
1 Scope	
2 Normative references	
3 Terms, definitions and symbols	
3.1 Terms and Definitions	
3.2 Symbol	
4 Requirements for the preparation of polydisperse spherical particles	
4.1 General requirements for standard sample production projects	
4.2 General performance requirements for polydisperse particle samples	
4.3 Particle size distribution of polydisperse particles	
5 Characterization of polydisperse particles	
5.1 Particle size distribution	
5.2 Aspect Ratio	
5.3 Apparent particle density	
5.4 Refractive Index	
6 Uncertainty estimation of particle size measurement	
6.1 Sampling uncertainty	
6.2 Other uncertainties	
6.3 Expanded uncertainty of particle size distribution	
Appendix A (Informative) Example of uncertainty estimation of particle size distribution based on N repeated measurements	
Appendix B (Informative) Example of uncertainty estimation based on the number of particle size distributions for a single measurement	
Appendix C (Informative) Conversion of number-based particle size distribution to volume-based cumulative particle size distribution that conforms to the log-normal particle size distribution	
Uncertainty estimation example	
Reference	

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 is Part 2 of GB/T 42351 Preparation of particle standard samples. GB/T 42351 has been published in the following parts.

--- Part 1: Polydisperse standards based on the picket fence distribution of monodisperse spherical particles;

--- Part 2: Polydisperse spherical particles.

This document is equivalent to ISO 14411-2:2020 "Preparation of particle standards Part 2: Polydisperse spherical particles".

Introduction

There are a variety of testing techniques for measuring particle size distribution, and when measuring certain characteristics of particles, they are usually approximated to a round or spherical equivalent.

When using these techniques to measure different properties of irregular particles, there are special requirements for the standardization of standard samples and measurement methods.

Methods for measuring particle size distribution are inherently indirect, employing the measurement of some other property that is then approximated by an ideal shape and size.

Therefore, these techniques usually require or assume some other specific constants.

Information is used to calculate particle size distribution.

Even if the measurement method does not require particle size calibration, standard samples are still required for quality control and operational verification. The particle size of such standard samples should be the distribution must conform to a standard whose values are traceable to the International System of Units (SI). Instrument manufacturers can demonstrate that all the calibration results of the input factors are verified and the output results are traceable to the International System of Units (SI).

The product is preferably polydisperse spherical particles.

In statistics, the unevenness of particle size distribution poses a great challenge to particle size analysis.

GB/T 42351 aims to provide standard samples for comparison of results of different particle size measurement techniques.

The preparation of particle standard samples composed of spherical particles is described, and the materials, preparation and characteristics of the standard samples are specified.

composition.

--- Part 1: Polydisperse standard samples based on the picket fence distribution of monodisperse spherical particles. Describes the polydisperse standard samples Materials and Preparation.

--- Part 2: Polydisperse spherical particles. Describes the preparation of polydisperse standard samples and the characterization of particle size distribution.

Preparation of particle standard samples Part 2: Polydisperse spherical particles

1 Scope

This document describes the preparation of spherical polydisperse particle standards with acceptable size distribution uncertainty and the characterization of their size distribution.

Potential uses of standard samples include reliability testing of laser diffraction and other related particle size analysis methods.

This document gives estimates of particle size polydispersity and the associated uncertainty. Small changes in particle size can result in large changes in the cumulative distribution.

change.

This document gives the necessary characteristics of particle standards intended for use in reliability testing of various types of particle size measurement equipment.

This document does not address the requirements for processing, homogeneity and stability assessment and certification as described in ISO 17034.

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

Note: GB/T 15000.7-2021 Guidelines for the work of reference samples Part 7: General requirements for the competence of reference sample producers (ISO 17034:2016, IDT)

3.1 Terms and Definitions

The following terms and definitions apply to this document.

3.1.1

aspect ratio

The ratio of the minimum Feret diameter to the maximum Feret diameter of a particle.

[Source. ISO 26824:2013, 4.5, modified] 3.1.2 apparent density the mass of a sample per unit volume.

Note: The unit is grams per cubic centimeter (g/cm³).

[Source. ISO 5755:2012, 3.10] 3.1.3 Standard sample reference material; RM A sample that is sufficiently homogeneous and stable in one or more specified properties and has been determined to be suitable for its intended use in the measurement process.

[Source. ISO 17034:2016, 3.3]