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Preparation of particulate reference materials —

Part 2: Polydisperse spherical particles

Préparation des matériaux de référence à l'état particulaire —

Partie 2: Particules sphériques polydispersées

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 24, *Particle characterization including sieving*, Subcommittee SC 4, *Particle characterization*.

A list of all parts in the ISO 14411 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The measurement of particle size distribution can be accomplished by a number of techniques which measure some characteristics of the particle and usually equate this to a circular or spherical equivalent. Each of these techniques measures different properties of an irregular particle and thus has particular requirements for reference materials and method standardization. Often, the methods that are employed for particle size distribution are indirect in nature which rely on measuring some other property and converting this to a particle size distribution by means of equations based on ideal shapes (usually spherical) and sizes to that of the equivalent particle size distribution. Thus, these techniques usually require or assume knowledge of some other constant in order to calculate the particle size distribution.

Even methods that do not require size calibration require reference materials for quality control and operation qualification. Such a reference material should be certified for its particle size distribution and the values should be traceable to the SI unit metre. This material allows instrument manufacturers to demonstrate proper calibration of all input factors and hence demonstrate that their instrument results are traceable to the SI unit metre. To achieve this, the reference material should be polydisperse and consist of spherical particles.

The heterogeneity of a particle size distribution poses statistical challenges for particle size analysis and therefore also for the production of reference materials for particle size analysis. This document therefore describes the production of particulate reference materials consisting of spherical particles.

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Preparation of particulate reference materials —

Part 2:
Polydisperse spherical particles

1 Scope

This document describes the specifications for spherical polydisperse particulate reference materials with acceptable uncertainty in particle size distribution and describes protocols for their characterization. One potential use of these reference materials is the reliability test of the laser-diffraction instruments and other particle sizing methods.

This document expresses polydispersity and the related uncertainties in size. Small variations in size can imply large variations in cumulative distribution.

This document describes the requirements of particulate reference materials, which are intended to be used to test the reliability of various types of particle size measurement apparatus. The requirements for processing, homogeneity and stability assessment as well as for the preparation of certificates, which are not addressed in this document are described in ISO 17034.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 17034, *General requirements for the competence of reference material producers*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1.1
aspect ratio
ratio of minimum Feret diameter to the maximum Feret diameter of a particle

[SOURCE: ISO 26824:2013, 4.5, modified.]

3.1.2
apparent density
mass per unit volume of the material

Note 1 to entry: It is expressed in g/cm^3.

[SOURCE: ISO 5755:2012, 3.10]

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