Second edition
2014-05-15

Representation of results of particle size analysis —

Part 2: Calculation of average particle sizes/ diameters and moments from particle size distributions

Représentation de données obtenues par analyse granulométrique —

Partie 2: Calcul des tailles/diamètres moyens des particules et des moments à partir de distributions granulométriques

Reference number
ISO 9276-2:2014(E)

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Published in Switzerland

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information.

The committee responsible for this document is ISO/TC 24, *Particle characterization including sieving*, Subcommittee SC 4, *Particle characterization*.

This second edition cancels and replaces the first edition (ISO 9276-2:2001), which has been technically revised.

ISO 9276 consists of the following parts, under the general title *Representation of results of particle size analysis*:

— *Part 1: Graphical representation*

— *Part 2: Calculation of average particle sizes/diameters and moments from particle size distributions*

— *Part 3: Adjustment of an experimental curve to a reference model*

— *Part 4: Characterization of a classification process*

— *Part 5: Methods of calculation relating to particle size analyses using logarithmic normal probability distribution*

— *Part 6: Descriptive and quantitative representation of particle shape and morphology*

Introduction

Particle size analysis is often used for characterization of particulate matter. The relationship between the physical properties of particulate matter, such as powder strength, flowability, dissolution rate, emulsion/suspension stability and particle size forms always the reason for such characterization. For materials having a particle size distribution, it is important to use the relevant parameter, a certain mean particle size, weighted for example by number, area or volume, in the relationship with physical properties.

This part of ISO 9276 describes two procedures for the use of moments for the calculation of mean sizes, the spread and other statistical measures of a particle size distribution.

The first method is named moment-notation. The specific utility of the moment-notation is to characterize size distributions by moments and mean sizes. The moment-notation addresses weighting principles from physics, especially mechanical engineering, and includes arithmetic means from number based distributions only as one part[1][2].

The second method is named moment-ratio-notation. The moment-ratio-notation is based on a number statistics and frequencies approach, but includes also conversion to other types of quantities[3][4].

Important is that the meaning of the subscripts of mean sizes defined in the moment-notation differs from the subscripts of mean sizes defined in the moment-ratio-notation. Both notations are linked by a simple relationship, given in Clause 6.

Both notations are suited for derivation and/or selection of mean sizes related to physical product and process properties for so-called property functions and process functions. The type of mean size to be preferred should have a causal relationship with the relevant physical product or process property.

The particle characterization community embraces a very broad spectrum of science disciplines. The notation of the size distribution employed has been influenced by the branch of industry and the application and thus no single notation has found universal favour.

There are some particle size dependent properties, like light scattering in certain particle size ranges, which cannot be characterized by mean particles sizes, derived from simple power law equations of the notation systems[5].