INTERNATIONAL STANDARD

ISO 9276-5

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Representation of results of particle size analysis —

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

Représentation de données obtenues par analyse granulométrique —

Partie 5: Méthodes de calcul relatif à l'analyse granulométrique à l'aide de la distribution de probabilité logarithmique normale

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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.

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 9276-5 was prepared by Technical Committee ISO/TC 24, *Sieves, sieving and other sizing methods*, Subcommittee SC 4, *Sizing by methods other than sieving*.

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 4: Characterization of a classification process*

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

Further parts are under preparation:

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

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

Introduction

Many cumulative particle size distributions, $Q_r(x)$, may be plotted on special graph paper which allow the cumulative size distribution to be represented as a straight line. Scales on the ordinate and the abscissa are generated from various mathematical formulae. In this part of ISO 9276, it is assumed that the cumulative particle size distribution follows a logarithmic normal probability distribution.

In this part of ISO 9276, the size, x, of a particle represents the diameter of a sphere. Depending on the situation, the particle size, x, may also represent the equivalent diameter of a particle of some other shape.

Representation of results of particle size analysis —

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

1 Scope

The main objective of this part of ISO 9276 is to provide the background for the representation of a cumulative particle size distribution which follows a logarithmic normal probability distribution, as a means by which calculations performed using particle size distribution functions may be unequivocally checked. The design of logarithmic normal probability graph paper is explained, as well as the calculation of moments, median diameters, average diameters and volume-specific surface area. Logarithmic normal probability distributions are often suitable for the representation of cumulative particle size distributions of any dimensionality. Their particular advantage lies in the fact that cumulative distributions, such as number-, length-, area-, volume- or mass-distributions, are represented by parallel lines, all of whose locations may be determined from a knowledge of the location of any one.

2 Normative references

The following referenced documents are indispensable for the application 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 9276-1, *Representation of results of particle size analysis — Part 1: Graphical representation*

ISO 9276-2:2001, *Representation of results of particle size analysis — Part 2: Calculation of average particle sizes/diameters and moments from particle size distributions*

3 Symbols

For the purposes of this part of ISO 9276, the following symbols apply.

c	cumulative percentage
e = 2,718 28...	base of natural logarithms
k	power of x in a moment
$M_{k,r}$	complete kth moment of a density distribution of dimensionality r
p	dimensionality (type of quantity) of a distribution, $p = 0$: number, $p = 1$: length, $p = 2$: area, $p = 3$: volume or mass
$q_r(x)$	density distribution of dimensionality r
$Q_r(x)$	cumulative distribution of dimensionality r