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Plastics — Ion exchange resin —

Part 4: Determination of particle size by laser diffraction method

Plastiques — Résine échangeuse d'ions —

Partie 4: Détermination de la taille des particules par la méthode de diffraction laser

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Contents

Page

Foreword

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This document was prepared by Technical Committee ISO/TC 61, *Plastic*, Subcommittee SC 5, *Physical-chemical properties*.

A list of all parts in the ISO 4907 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.

Plastics — Ion exchange resin —

Part 4: Determination of particle size by laser diffraction method

1 Scope

This document specifies the test method for determination of particle size of ion exchange resin by laser diffraction, ranging from 0,1 µm to 2,0 mm.

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 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 4907-1:2023, *Plastics — Ion exchange resin — Part 1: Determination of exchange capacity of acrylic anion exchange resins*

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

ISO 13320, *Particle size analysis — Laser diffraction methods*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13320 and the following apply.

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

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

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

3.1.1
percent below specified lower size
volume percentage of ion-exchange resin which less than the specified lower particle size to the total volume

3.1.2
percent above specified upper size
volume percentage of ion-exchange resin which greater than the specified upper particle size to the total volume

3.1.3
percent between specified range size
volume percentage of ion-exchange resin which greater than or equal to the specified lower particle size and less than or equal to the upper particle size to the total volume

3.1.4
effective size
particle diameter corresponding to the 10th percentile of the cumulative undersize distribution by volume

3.1.5
uniformity coefficient
ratio of the particle diameter corresponding to the 60th and the 10th percentile of the cumulative undersize distribution by volume

3.1.6
median size
particle diameter corresponding to the 50th percentile of the cumulative undersize distribution by volume

[SOURCE: ISO 13320:2020, 3.2, modified — symbol "$D_{50,3}$" and word "here" have been omitted because of context]

3.2 Symbols

For the purposes of this document, the symbols given in ISO 13320, ISO 9276-2 and the following apply.

$D_{10,3}$	particle diameter corresponding to the 10th percentile of the cumulative undersize distribution by volume;
$D_{50,3}$	median particle diameter corresponding to the 50th percentile of the cumulative undersize distribution by volume;
$D_{60,3}$	particle diameter corresponding to the 60th percentile of the cumulative undersize distribution by volume;
$D_{90,3}$	particle diameter corresponding to the 90th percentile of the cumulative undersize distribution by volume;
$\overline{D}_{(3,2)}$	area-weighted mean size, Sauter mean diameter, 3-weighted harmonic mean size;
$\overline{D}_{(4,3)}$	volume-weighted mean size.

4 Principle

A test sample, dispersed at an adequate concentration in water, is passed through the beam of a monochromatic light source, usually a laser. The light scattered by the particles, at various angles, is measured by an array of photo detectors. The numerical values relating to the scattering pattern are recorded for subsequent analysis. The numerical scattering values are then transformed, using an appropriate optical model and mathematical procedure, to yield the proportion of the total volume of particles to a discrete number of size classes forming a volumetric particle size distribution (PSD).

5 Reagents

Water, grade 3 purity, as defined in ISO 3696, or better.

6 Apparatus

Laser diffraction particle size analyser, as specified in ISO 13320, range cover 0,1 µm to 2 mm.

7 Pretreatment

Obtain a representative sample of the ion exchange resins in accordance with ISO 4907-1:2023, Annex A. The test sample can be converted into any desired or original form.