INTERNATIONAL STANDARD

ISO 13318-3

First edition
2004-07-15

Determination of particle size distribution by centrifugal liquid sedimentation methods —

Part 3: Centrifugal X-ray method

Détermination de la distribution granulométrique par les méthodes de sédimentation centrifuge dans un liquide —

Partie 3: Méthode centrifuge aux rayons X

Reference number
ISO 13318-3:2004(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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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.

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.

ISO 13318-3 was prepared by Technical Committee ISO/TC 24, *Sieves, sieving and other sizing methods*, Subcommittee SC 4, *Sizing by methods other than sieving*.

ISO 13318 consists of the following parts, under the general title *Determination of particle size distribution by centrifugal liquid sedimentation methods*:

— *Part 1: General principles and guidelines*

— *Part 2: Photocentrifuge method*

— *Part 3: Centrifugal X-ray method*

Introduction

The X-ray centrifuge monitors particle concentration changes at a fixed or variable radius. In some configurations, the instrument can also be used in a gravitational mode (see ISO 13317-1) and those data blended with other data determined in the centrifugal mode, thus extending the typical upper size limit above 5 µm.

Determination of particle size distribution by centrifugal liquid sedimentation methods —

Part 3:
Centrifugal X-ray method

WARNING — This part of ISO 13318 may involve hazardous materials operations and equipment. This part of ISO 13318 does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of the regulatory limitations prior to its use.

1 Scope

This part of ISO 13318 describes a method for determining the particle size distribution of homogeneous particulate material using centrifugal sedimentation in a liquid. Solids concentrations are determined by the attenuation of an X-ray beam. The resulting signal enables conversion to a particle size distribution.

The method of determining the particle size distribution described in this standard is applicable to powders which can be dispersed in liquids or powders which are present in slurry form. The typical particle size range for analysis is from 0,1 µm to 5 µm. The method is applicable to powders in which all particles have the same effective density, chemical composition and comparable shapes. Materials possessing elements with an atomic number greater than about 12 can be expected to produce adequate X-ray opacity. Particles should not undergo chemical or physical change in the suspension liquid. It is necessary that the particles have a higher density than that of the liquid.

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 13318-1, *Determination of particle size distribution by centrifugal liquid sedimentation methods — Part 1: General principles and guidelines*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13318-1 and the following apply.

4 Symbols

For the purpose of this document, the symbols of ISO 13318-1 and the following apply.

B function of the atomic number of the sample elements in the beam

C concentration of sample in the beam

I_0 transmission of the emergent X-ray beam through the suspending fluid with no particles present

I transmission of the emergent X-ray beam through suspension at radius M and time t