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## Particle size analysis — Image analysis methods —

### Part 1: Static image analysis methods

*Analyse granulométrique — Méthodes par analyse d'images —  
Partie 1: Méthodes par analyse d'images statiques*



Reference number  
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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 13322-1 was prepared by Technical Committee ISO/TC 24, *Sieves, sieving and other sizing methods*, Subcommittee SC 4, *Sizing by methods other than sieving*.

ISO 13322 consists of the following parts, under the general title *Particle size analysis — Image analysis methods*:

- *Part 1: Static image analysis methods*
- *Part 2: Dynamic image analysis methods*

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## Introduction

The purpose of this part of ISO 13322 is to give guidance for a measurement description and its validation when determining particle size by image analysis.

Image analysis is a technique used in very different applications on image material with variations in material properties. Hence, it is not relevant to describe an exact standard method for determination of particle size by image analysis. The aim of this part of ISO 13322 is limited to give a standardized description of the technique used and a standardized validation.

This part of ISO 13322 includes methods of calibration verification using a certified standard graticule as a reference or by using certified standard particles. It is sensible to make some measurements on particles, or other reference objects, of known size so that the likely systematic uncertainties introduced by the equipment can be calculated.

This part of ISO 13322 gives a recommendation for a precise description of the distribution including the number of analyzed particles and an analysis window to make sure that the obtained information is valid.

Measurement of particle-size distributions by microscopy methods is apparently simple, but because only a small amount of sample is examined, considerable care has to be exercised in order to ensure that the analysis is representative of the bulk sample. This can be demonstrated by splitting the original sample and making measurements on three or more parts. Statistical analysis of the data, for example using the Student's *t*-test, will reveal whether the samples are truly representative of the whole.

Errors introduced at all stages of the analysis from sub-division of the sample to generation of the final result add to the total uncertainty of measurement and it is important to obtain estimates for the uncertainty arising from each stage. Indications where this is required are given at the appropriate point in the method.

Because of the diverse range of equipment and sample preparation expertise available, it is not intended to give a prescriptive procedure where use of individual methods does not jeopardize the validity of the data. However, essential operations are identified to ensure that measurements made conform to this part of ISO 13322 and are traceable.