

---

---

**Particle size analysis — Image analysis  
methods —**

Part 2:  
**Dynamic image analysis methods**

*Analyse granulométrique — Méthodes par analyse d'images —  
Partie 2: Méthodes par analyse d'images dynamiques*



**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

This document is a preview generated by EVS

© ISO 2006

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

**Contents**

Page

Foreword.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms, definitions and symbols.....	1
3.1 Terms and definitions.....	1
3.2 Symbols.....	2
4 Principle.....	3
4.1 General.....	3
4.2 Particle motion.....	4
4.3 Particle positioning.....	4
5 Operational procedures.....	5
5.1 General.....	5
5.2 Still image resolution.....	5
5.3 Calibration and traceability.....	6
5.4 Size classes and magnification.....	6
5.5 Particle edges.....	6
5.6 Measurements.....	7
6 Sample preparation.....	7
7 Sample and measurement variability.....	7
Annex A (informative) Particle velocity and exposure time recommended.....	8
Annex B (informative) Maximum particle size recommended.....	11
Annex C (informative) Typical examples of sample feed and image capture systems.....	16
Bibliography.....	24

## 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 13322-2 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*

## Introduction

The purpose of this part of ISO 13322 is to provide guidance for measuring and describing particle size distribution, using image analysis methods where particles are in motion. This entails using techniques for dispersing particles in liquid or gas, taking in-focus, still images of them while the particles are moving and subsequently analysing the images. This methodology is called dynamic image analysis.

There are several image capture methods. Some typical methods are described in this part of ISO 13322.

This document is a preview generated by EVS

# Particle size analysis — Image analysis methods —

## Part 2: Dynamic image analysis methods

### 1 Scope

This part of ISO 13322 describes methods for controlling the position of moving particles in a liquid or gas and on a conveyor, as well as the image capture and image analysis of the particles. These methods are used to measure the particle sizes and their distributions, the particles being appropriately dispersed in the liquid or gas medium or on the conveyor. The practical limitations of the derived particle size are addressed when using this part of ISO 13322.

### 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 13322-1:2004, *Particle size analysis — Image analysis methods — Part 1: Static image analysis methods*

### 3 Terms, definitions and symbols

#### 3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

##### 3.1.1

##### **flow-cell**

measurement cell inside which the fluid-particle mixture flows

##### 3.1.2

##### **orifice tube**

tube with an aperture through which a stream of fluid with dispersed particles flows

##### 3.1.3

##### **sheath flow**

clean fluid flow surrounding particle-laden fluid for directing particles into a specific measurement zone

##### 3.1.4

##### **particle illumination**

continuous illumination for image capture device with an electronic exposure time controller, or illumination of short duration for synchronized image capture device