AS 4816.1—2002
ISO 13317-1:2001
Reconfirmed 2016

Australian Standard™

Determination of particle size distribution by gravitational liquid sedimentation methods

Part 1: General principles and guidelines

Standards Australia

This Australian Standard was prepared by Committee CH-032, Particle Size Analysis. It was approved on behalf of the Council of Standards Australia on 30 November 2001 and published on 18 January 2002.

The following interests are represented on Committee CH-032:

Australian Concrete Association

CSIRO Land and Water

Queensland University of Technology

Science Industry Australia

Royal Australian Chemical Institute

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University of South Australia

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STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 4816.1—2002

Determination of particle size distribution by gravitational liquid sedimentation methods

Part 1: General principles and guidelines

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Technical Committee NT-001 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 9 September 2016.

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NOTES

Australian Standard™

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PREFACE

This Standard was prepared by the Standards Australia Committee CH-032, Particle Size Analysis. This Standard is identical with and has been reproduced from ISO 13317-1:2001, *Determination of particle size distribution by gravitational liquid sedimentation methods,* Part 1: *General principles and guidelines*.

The objective of this Standard is to cover methods for determining the particle size distributions of particulate materials, typically in the size range 0.5 μm to 100 μm, by gravitational sedimentation in a liquid.

As this Standard is reproduced from an international Standard, the following applies:

(a) Its number appears on the cover and title page while the International Standard number appears only on the cover.

(b) In the source text, 'this part of ISO 13317' should read 'this Australian Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

(d) Substitute 'mL' for ml' wherever it appears.

(e) The following corrections should be made:

  (i) Page 6, the denominator of Equation 9 should be x_{St}. It should not be raised to the power 5/2.

  (ii) Page 8, Clause 6.2, line 3. *replace* 'mutual affect' with 'mutual effect'.

(f) With the exception of ISO 9276-1, *Determination of particle size distribution by gravitational liquid sedimentation methods*, Part 1: *General principles and guidelines* which has been adopted as AS 4932.1, *Determination of particle size distribution by gravitational liquid sedimentation* methods, Part 1: *General principles and guidelines*, the ISO documents listed as normative references in Clause 2 have not been adopted as Australian Standards.

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INTRODUCTION

Gravitational sedimentation particle size analysis methods are among those in current use for determining size distribution of many powders. Typically, the gravitational methods apply to samples in the 0,5 µm to 100 µm size range and where the sedimentation condition for a Reynolds number $< 0{,}25$ is satisfied.

No single method of size analysis can be specified to cover the many different types of material encountered, but it is possible to recommend procedures that may be applied in the majority of cases. The purpose of this part of ISO 13317 is to obtain uniformity in procedure for any gravitational method selected to facilitate comparisons of size analysis made in different laboratories.

Gravitational sedimentation methods may be undertaken:

— as part of a research project involving an investigation of the particle size distribution of a material;

— as part of a control procedure for the production of a material where the particle size distribution is important;

— as the basis of a contract for the supply of material specified to be within stated specification limits.

AUSTRALIAN STANDARD

Determination of particle size distribution by gravitational liquid sedimentation methods —

Part 1:
General principles and guidelines

1 Scope

This part of ISO 13317 covers methods for determining the particle size distributions of particulate materials, typically in the size range 0,5 μm to 100 μm, by gravitational sedimentation in a liquid.

NOTE This part of ISO 13317 may involve hazardous materials, operations and equipment. This part of ISO 13317 does not purport to address all the safety problems associated with its use. It is the responsibility of the user of this part of ISO 13317 to establish appropriate safety and health practices and to determine the applicability of the regulatory limitations prior to its use.

The methods of determining the particle size distribution described in this part of ISO 13317 are applicable to slurries or to particulate materials which can be dispersed in liquids. A positive density difference between the discrete and continuous phases is necessary, although gravitational photosedimentation can be used for emulsions where the droplets are less dense than the liquid in which they are dispersed. Particles should not undergo any physical or chemical change in the suspending liquid. The usual precautions need to be taken with hazardous material, and explosion proof analysers are required when examining volatile liquids with a low flash point.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 13317. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 13317 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 758, *Liquid chemical products for industrial use — Determination of density at 20 °C.*

ISO 787-10, *General methods of test for pigments and extenders — Part 10: Determination of density — Pyknometer method.*

ISO 2591-1, *Test sieving — Part 1: Methods using test sieves of woven wire cloth and perforated metal plate.*

ISO 8213, *Chemical products for industrial use — Sampling techniques — Solid chemical products in the form of particles varying from powders to coarse lumps.*

ISO 9276-1, *Representation of results of particle size analysis — Part 1: Graphical representation.*

ISO 13317-2, *Determination of particle size distribution by gravitational liquid sedimentation methods — Part 2: Fixed pipette method.*

ISO 13317-3, *Determination of particle size distribution by gravitational liquid sedimentation methods — Part 3: X-ray gravitational technique.*

ISO 14887, *Sample preparation — Dispersing procedures for powders in liquids.*