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ISO 9276-1:2025

Representation of results of particle size analysis

Part 1: Graphical representation



AS ISO 9276.1:2026

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This page explains the meaning of the language and structure of this Standard.

Refer to Standards Australia's Standardisation Guide 006 for more details about drafting rules.

Australian and Australian/New Zealand Standards are voluntary unless they are referenced in legislation or called up in contracts.

Requirements

To conform to a Standard, all requirements in the Standard need to be met.

A requirement is any statement in the Standard which uses the word "shall".

Recommendations, permissions and possibilities

The following words are commonly used in Standards, but statements using them do not have to be followed to conform to the Standard:

(a) "should" means that something is recommended.

(b) "may" means that something is permitted.

(c) "can" means that something is possible.

Structure of Standards

A Standard always has the following parts:

(i) The Preface states who developed the Standard, what the Standard is aiming to do, and how it relates to other documents.

(ii) The Scope states what the Standard is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Standard as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Standard.

A Standard may also include other parts, such as the following:

(1) A normative appendix sets additional requirements that need to be conformed to.

(2) An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Standard will explain when those requirements apply.

(3) A Bibliography lists documents referenced in the Standard but not as part of requirements.

Many Standards include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

Preface

This Standard was prepared by the Standards Australia Committee NT-001, Nanotechnologies.

The objective of this document is to specify guidelines and instructions for the graphical representation of particle size analysis data in histograms, distribution densities and cumulative distributions. It also establishes a standard nomenclature to obtain the histograms, distribution densities and cumulative distributions from measured particle size data.

This document applies to the graphical representation of particle size distributions (PSDs) of solid particles, droplets or gas bubbles covering all size ranges.

This document is identical to, and has been reproduced from, ISO 9276-1:2025, *Representation of results of particle size analysis — Part 1: Graphical representation*.

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 24, *Particle characterization including sieving*, Subcommittee SC 4, *Particle characterization*.

This third edition cancels and replaces the second edition (ISO 9276-1:1998), which has been technically revised. It also incorporates the Technical Corrigendum ISO 9276-1:1998/Cor 1:2004.

The main changes are as follows:

— Clause 3 has been added;

— Formulae (9) and (10) have been added in 7.2;

— Clauses 8 and 9 have been added;

— Annex B and Annex C have been added.

A list of all parts in the ISO 9276 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.

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Introduction

The characterization of a dispersed phase with respect to its particle size distribution (PSD) is a major task, whenever the generation, emission, transport, application or consumption of particulate matter is monitored or investigated. The spectrum of relevant materials is very broad and "particle" can refer to grains, flakes, fibres, droplets, bubbles, micelles or pores. Within a particulate material, particles typically vary with regard to their size. The distribution of this measurand is characterized by the relative quantity of particles belonging to a specific size class.

There are a wide range of methods for the size analysis of particulate matter. For many reasons, the results will, in general, not be the same. One of the main problems still encountered with most methods in use is their unknown absolute accuracy. Apart from this, there are two principal origins of the differences among measured PSDs.

Firstly, the measurand "particle size" is an ambiguous property being specified by the measurement principle of the instrumentation and the way of signal analysis. Both specifications define the type of particles which are intrinsically measured: agglomerates or their constituent particles; Pickering emulsion droplets or the nanoparticles at their surface; complete core-shell particles or the core of the particles only. Therefore, “size” can refer to a variety of physical and geometric properties.

Secondly, the distribution of size can be measured and expressed by different types (and measures) of quantity.[1]

A disperse system can be described by different types of PSD, which supplement each other in providing a comprehensive view on the granulometric state of the particulate material. Moreover, each type of PSD can be represented in various manners.

Beside numerical and mathematical representations, graphical ones are particularly popular and useful because they allow for a quick comprehension of the main PSD features or a fast evaluation of differences among product lots. There are various ways of plotting a PSD, which emphasize different details though communicating the same information. This requires explanation, especially when a PSD is described by discrete data.

A harmonized view on terms and a common understanding of how to graphically plot and interpret PSDs support the communication between suppliers and clients and improve the comparability of measurement data from different instruments.

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Representation of results of particle size analysis

Part 1: Graphical representation

1 Scope

This document specifies guidelines and instructions for the graphical representation of particle size analysis data in histograms, distribution densities and cumulative distributions. It also establishes a standard nomenclature to obtain the histograms, distribution densities and cumulative distributions from measured particle size data.

This document applies to the graphical representation of particle size distributions (PSDs) of solid particles, droplets or gas bubbles covering all size ranges.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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
particle
minute piece of matter with defined physical boundaries

Note 1 to entry: A physical boundary can also be described as an interface.

Note 2 to entry: A particle can move as a unit.

Note 3 to entry: This general particle definition applies to nano-objects.

[SOURCE: ISO 26824:2022 3.1.1]

3.2
particle size
x
d
linear dimension of a *particle* (3.1) determined by a specified measurement method and under specified measurement conditions

Note 1 to entry: Different methods of analysis are based on the measurement of different physical properties. Independent of the particle property actually measured, the particle size is reported as a linear dimension, e.g. as the equivalent diameter.

Note 2 to entry: Possible types of particle size values are equivalent diameters from physical measurement or equivalent circular diameters from image analysis as well as linear dimensions, e.g. sieve size of a particle, the smallest aperture size through which a particle will pass if presented in the most favourable orientation.

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