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Australian STANDARD®

STANDARDS Australia

Determination of particle size distribution — Single particle light interaction methods

Part 4: Light scattering airborne particle counter for clean spaces



AS ISO 21501.4:2026

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Australian Institute of Health & Safety
Australian Nuclear Science and Technology Organisation
Consumers' Federation of Australia
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National Association of Testing Authorities Australia
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How to read this Standard

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.

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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 describe a calibration and verification method for a light scattering airborne particle counter (LSAPC), which is used to measure the size distribution and particle number concentration of particles suspended in air. The light scattering method described in this document is based on single particle measurements. The typical size range of particles measured by this method is between 0.1 μm and 10 μm in particle size.

Instruments that conform to this document are used for the classification of air cleanliness in cleanrooms and associated controlled environments, in accordance with AS ISO 14644.1 and AS ISO 14644.2, as well as the measurement of number and size distribution of particles in various environments.

The following parameters are within the scope of this document:

(a) Size setting error.

(b) Counting efficiency.

(c) Size resolution.

(d) False count.

(e) Maximum particle number concentration.

(f) Sampling flow rate error.

(g) Sampling time error.

(h) Response rate.

(i) Calibration interval.

(j) Reporting results from test and calibration.

This document is identical to, and has been reproduced from, ISO 21501-4:2018, *Determination of particle size distribution — Single particle light interaction methods — Part 4: Light scattering airborne particle counter for clean spaces* and its Amendment No. 1 (2023), which has been added at the end of the source text.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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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 documents 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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: 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 second edition cancels and replaces the first edition (ISO 21501-4:2007), which has been technically revised.

The main changes from the previous edition are:

— Clause 4 for “Principle” and Clause 5 for “Basic configuration” have been added;

— “size calibration” and “verification of size setting” have been combined as “size setting error” in the requirements clause;

— “Test report” (3.11 in the previous edition) has been changed to 6.10 on “Reporting of test and calibration results”;

— information about uncertainties has been enriched and is now the subject of Annex E.

A list of all parts in the ISO 21501 series can be found on the ISO website.

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Introduction

Monitoring particle contamination levels is required in various fields, e.g. in the electronic industry, in the pharmaceutical industry, in the manufacturing of precision machines and in medical operations. Particle counters are useful instruments for monitoring particle contamination in air. The purpose of this document is to provide a calibration procedure and verification method for particle counters, so as to minimize the inaccuracy in the measurement result by a counter, as well as the differences in the results measured by different instruments.

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Australian Standard®

Determination of particle size distribution — Single particle light interaction methods

Part 4: Light scattering airborne particle counter for clean spaces

1 Scope

This document describes a calibration and verification method for a light scattering airborne particle counter (LSAPC), which is used to measure the size distribution and particle number concentration of particles suspended in air. The light scattering method described in this document is based on single particle measurements. The typical size range of particles measured by this method is between 0,1 μm and 10 μm in particle size.

Instruments that conform to this document are used for the classification of air cleanliness in cleanrooms and associated controlled environments in accordance with ISO 14644-1 and ISO 14644-2, as well as the measurement of number and size distribution of particles in various environments.

The following parameters are within the scope of this document:

— size setting error;

— counting efficiency;

— size resolution;

— false count;

— maximum particle number concentration;

— sampling flow rate error;

— sampling time error;

— response rate;

— calibration interval;

— reporting results from test and calibration.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

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