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**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB/T 45322.1-2025**

**Particle - Separation performance test for particle size  
separator - Part 1: General principles**

**颗粒 粒度切割器切割性能测试 第1部分：通则**

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## Table of Contents

|     |                                                                            |
|-----|----------------------------------------------------------------------------|
| 1   | Scope                                                                      |
| 2   | Normative references                                                       |
| 3   | Terms and definitions                                                      |
| 3.4 | Designated flow rate The specified operating flow rate of the cutter. Note |
| 4   | Cutting performance                                                        |
| 4.1 | General                                                                    |
| 4.2 | Cutting efficiency (Ex) for a given particle size                          |
| 4.3 | Cutting efficiency curve 2 4.4 50% cut particle size (Da50)                |
| 4.5 | Geometric standard deviation of cutting efficiency curve (sigmag)          |
| 5   | General requirements for cutting performance tests                         |
| 5.1 | General                                                                    |
| 5.2 | Test aerosol                                                               |
| 5.3 | Test methods and equipment                                                 |
| 5.4 | Particle Concentration Measurement                                         |
| 6   | Data Processing                                                            |
| 6.1 | Conversion of particle size values                                         |
| 6.2 | Mean value and relative standard deviation of cutting efficiency           |
| 6.3 | Data Fitting                                                               |
| 8   | Reference                                                                  |

## Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting. This document is part 1 of GB/T 45322 "Testing the cutting performance of particle size cutters". GB/T 45322 has been published The following parts.

2. Diversion method. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document was proposed and coordinated by the National Technical Committee for Particle Characterization and Sorting and Sieve Standardization (SAC/TC168). This document was drafted by: Qingdao Metrology Technology Research Institute, China Institute of Metrology, China National Environmental Monitoring Center,

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The particle size cutter is the core part that separates air particles by size (aerodynamic diameter) based on the principle of aerodynamics. It is often used to collect particles of a specific size range in the air. The cutting performance reflects the ability of the cutter to separate particles of different sizes. One of the important factors affecting sampling consistency. Common cutting performance test methods include split flow method, static box method and elution method. Users can use the following methods according to the specific conditions of the cutter to be tested. Select the appropriate test method based on the test conditions. GB/T 45322 is planned to consist of 4 parts.

- 1.General. The purpose is to provide common definitions and requirements for the test method of particle size cutter cutting performance.
- 2.Shunt method. The purpose is to standardize the test process and requirements of the shunt method.
- 3.Static chamber method. The purpose is to standardize the test process and requirements of the static chamber method.
- 4.Elution method. The purpose is to standardize the test process and requirements of the elution method. Particle size cutter cutting performance test Part

## 1 Scope

GB/T 45322.1-2025 gives the general principles for testing the separation performance of a

particle size separator, the cyclone, impactor or classifier that is supposed to admit particles below a stated size and reject those above it. Everything downstream depends on how sharply it actually does so: an ambient air sampler that claims a 2.5 micrometre cut but has a shallow separation curve reports a concentration that is not PM<sub>2.5</sub>, and a classifier in a powder plant that overlaps the cut produces off-specification product. The standard defines the cutting performance and its parameters, the cut efficiency at a given particle size, the cut size at fifty per cent efficiency and the sharpness of the separation curve, then the test principle, the test aerosol or powder and its generation, the reference measurement of the size distribution upstream and downstream, the operating conditions, the construction of the efficiency curve, the derivation of the parameters and the uncertainty and reporting. It takes effect on 1 September 2025.

This document specifies common definitions and requirements for the test method for the cutting performance of particle size cutters. This document applies to the testing of the cutting performance of the particle size cutter (hereinafter referred to as the "cutter") for air particle sampling.

## 2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 16418 Terminology of particle systems

GB/T 31159 Terminology for atmospheric aerosol observation

## 3 Terms and definitions

The terms and definitions defined in GB/T 16418 and GB/T 31159 and the following apply to this document.

**3.1 Particle size separator** Particle size separator A device that selectively separates air particles by particle size based on aerodynamic principles.

**Note.** Cutter is widely used in the field of air particle sampling and separation, such as PM<sub>10</sub> and PM

2.5 cutters are used to collect particles below 10 µm and Air particles smaller than 2.5µm. [Source: GB/T 31159-2014, 6.5, 6.6, modified]

**3.2 Monodisperse aerosol** monodisperse aerosol Aerosols with narrow particle size distribution. **Note**

1. Monodispersity can be quantified by the geometric standard deviation (GSD) of the particle size distribution. NOTE

2 In ISO 26824.2022, the term "monodisperse" means a GSD less than or equal to 1.15. [Source: ISO 26824.2022, 3.12.25]

3.3 Polydisperse aerosol Aerosols with a wide particle size distribution.

**3.4 Designated flow rate The specified operating flow rate of the cutter. Note**

1. The specified flow rate refers to the volume flow rate under operating conditions. Note

2. For a cutter, changing the flow rate will result in a change in cutting performance.