

ICS 43.060.20; 43.060.40



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

GB/T 28957.1-2023

**Road vehicles - Test dust for filter evaluation - Part 1: Silicon
dioxide test dust
(English Translation)**

Issued on: November 27, 2023

Implemented on: August 1, 2024

Issued by: State Administration for Market Regulation

Table of Contents

Foreword	3
Introduction	5
1 Scope	6
2 Normative References	6
3 Terms and Definitions	6
4 Description of Test Dust	7
5 Particle Size Distribution	8
6 Chemical Composition	10
ISO 12103-1:2016	12
12103-1:2016, and Their Causes	14
Appendix D (normative) Analysis Equipment and Operating Procedures	16
Appendix E (informative) Processing and Preparation	21
Bibliography	26

1 Scope

This document specifies the particle size distribution limits and chemical composition of the four grades of test dust manufactured using Arizona desert sand and the two types of test dust from the BF silicon dioxide series.

This document is applicable to the performance measurement of filters for road vehicles, as well as the performance measurement of filters for general-purpose internal combustion engines, and the study of wear of bearings, sealing elements and other components.

This document does not apply to the calibration of particle counters. If there is a demand in this regard, refer to GB/T 18854.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 176-2017 Methods for Chemical Analysis of Cement (ISO 29581-1:2009, NEQ)

GB/T 19077-2016 Particle Size Analysis - Laser Diffraction Methods (ISO 13320:2009, IDT)

GB/T 21780-2008 Particle Size Analysis - Sedimentation Analysis in the Gravitational Field

-

Pipette Method (DIN 66115:1983, IDT)

3 Terms and Definitions

The following terms and definitions are applicable to this document.

3.1 bulk density

Naturally fill a container of known volume, the mass of the particles is divided by the volume of the container.

NOTE: see the test method in GB/T 31057.1-2014.

[source: GB/T 16418-2008, 2.2.4.7]

The analyzer software setup process is as follows.

- a) Open the Microtrac FLEX software program.
- b) Click "Measure" in the main program window and select S3500 / S3000.
- c) Click "File" and select "Open Measurement Database" to select the appropriate database for the material to be analyzed.
- d) Click the "SOP" (standard operating procedure) icon on the "Measurement" toolbar.

Click "Option" to set the appropriate measurement parameters. In accordance with the following method, set the measurement parameters.

- 1) The timing tag settings are as follows:

lambda Set the return-to-zero-time to 30 s;

lambda Set the running time to 30 s;

lambda Set the number of runs to 3 times.

- 2) In accordance with the demands, use the identifier tags to enter general information.

- 3) Utilize the following tags to set analysis tags.

lambda Particle information tag:

---Select refractive index 1.51 and save with appropriate particle name;

---Particle feature box: set the transparency to transparent; set the shape to irregular.

lambda Fluid information tag:

---Select fluid: water;

---Select refractive index: 1.333.

lambda Analysis option tag:

---Select S3000 from the "Analysis Mode" drop-down list;

---Select "Launch Criteria" from the "Filter" drop-down list.

lambda Utilize the sample injection tag to enter user-defined injection parameters for each level, as shown in Table D.3.

b) Incompatibility (substances to avoid contact with): strong acid;

c) Harmful decomposition: will not occur;

d) Harmful polymerization: will not occur;

e) Situations to avoid: none.

E.2.8.1 Potential health effects

In accordance with the duration and extent of exposure, potential health effects may vary. In order to reduce or eliminate health hazards associated with dust, it is necessary to adopt the exposure control or personal protection methods described in E.2.4.

E.2.8.2 Eye contact

(acute / chronic) exposure to airborne dust may cause acute or chronic irritation or inflammation of the cornea.

E.2.8.3 Inhalation

The following are health risks associated with inhalation.

a) The main hazard is silicosis, caused by the inhalation and retention of inhalable crystalline silica dust. There are many forms of silicosis, including chronic (or common), aggressive or acute. Chronic (or common) silicosis (often referred to as silicosis in general) is the most common form of silicosis and is usually caused by years of exposure to relatively low levels of inhalable crystalline silica dust in the air.

It may be further classified as simple or complex silicosis. Simple silicosis is characterized by pulmonary lesions (shown as radiographic opaque bodies less than

1 cm in diameter), predominantly in the upper lung region. Typically, simple silicosis will cause no symptoms, or lead to detectable changes in lung function or dysfunction.

b) Simple silicosis may be a progressive disease and may develop into complex silicosis or progressive massive fibrosis (PMF). Complex silicosis, or PMF, is characterized by lung

lesions (shown as radiographic opaque bodies greater than 1 cm in diameter).

Although symptoms associated with complex silicosis or PMF may not be present, if symptoms are present, then, they may include difficulty breathing, wheezing, coughing and phlegm. Complex silicosis, or PMF, may cause reduced lung function, potentially leading to functional impairment.

c) Advanced complex silicosis, or PMF, may cause death. Advanced complex silicosis, or PMF, may cause heart disease, second only to lung disease (cor pulmonale).

Aggressive silicosis will occur after exposure to high concentrations of inhalable crystalline silica in a relatively short period of time; lesions will appear in the lungs within 5 years of the initial exposure, and the lesions will develop rapidly. Except that

GB/T 34600-2017 | GB/T 34593-2017 | GB/T 32231-2015 | GB/T 48078.1-2026 |