International Standard

ISO 15957

Test dusts for evaluating air cleaning equipment

Poussières d'essai pour l'évaluation des équipements d'épuration d'air

Second edition
2026-02

Reference number
ISO 15957:2026(en)

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Published in Switzerland

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Foreword

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This document was prepared by Technical Committee ISO/TC 142, *Cleaning equipment for air and other gases,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 195, *Cleaning equipment for air and other gases,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 15957:2015), which has been technically revised.

The main changes are as follows:

— Clause 4, Table 1, addition of test dust L5 Kronos 2160;

— Clause 4, Table 1, addition of the mean diameter for carbon.

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

Filters are subjected to evaluation of their initial performance and dust-loaded performance in laboratory tests using specified test dusts. The results reflect the performance of the filter as installed in a building. However, since the properties of atmospheric aerosols vary to a large extent regionally, seasonally, and according to weather conditions, test data obtained with a given test dust seldom accurately predict the filter performance as actually used. In addition to this, the test results with a given test dust can differ from those obtained by other laboratories because the filter performance is affected by many factors, for example, particle size distribution, particle agglomeration and electrical charge. Despite these problems in testing filter performance, test data are used for the classification of filters, estimation of energy consumption, life cycle cost (LCC) and life cycle assessment (LCA).

The test dust used for evaluating initial performance and loaded performance of filters can have a different specification from the dust used to achieve filter loading.

This document does not control the specification, manufacturing or use of test dusts. It describes the properties of test dusts which can be used to load filters, and the requirements for test dust generation that will ensure that useful laboratory test results are obtained in order to mimic the actual use as much as possible.

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Test dusts for evaluating air cleaning equipment

1 Scope

This document defines the properties of load test dusts used for heating, ventilation and air conditioning (HVAC) air filters as well as air cleaning equipment in laboratories. Test dusts used for evaluation of efficiency performance are not included.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 12103-1, *Road vehicles — Test contaminants for filter evaluation — Part 1: Arizona test dust*

ISO 16890-3, *Air filters for general ventilation — Part 3: Determination of the gravimetric efficiency and the air flow resistance versus the mass of test dust captured*

EN 15051-2, *Workplace exposure - Measurement of the dustiness of bulk materials - Part 2: Rotating drum method*

SAP 14-12, *SAP Test Powder 3*

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
dust feeder
device which is used to distribute test dust to the filter

[SOURCE: ISO 29464:2024, 3.2.44]

3.2
median diameter
diameter of the particle for which the cumulated volume fraction is equal to 50 % on a cumulated volume particle size distribution curve

[SOURCE: ISO 29464:2024, 3.2.36]

3.3
particle size
geometric diameter (equivalent spherical, optical or aerodynamic, depending on context) of the particles of an aerosol

[SOURCE: ISO 29464:2024, 3.2.117]

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3.4
particle size distribution
presentation, in the form of tables of numbers or of graphs, of the experimental results obtained using a method or an apparatus capable of measuring the equivalent diameter of particles in a sample or capable of giving the proportion of particles for which the equivalent diameter lies between defined limits

[SOURCE: ISO 29464:2024, 3.2.119]

3.5
undersize
percentage of particles smaller than a specified *particle size* (3.3) in a *particle size distribution* (3.4)

Note 1 to entry: Undersize measurement can be particle number or concentration.

[SOURCE: ISO 29464:2024, 3.2.159]

3.6
particulate matter
$PM_{2,5}$
particulate matter which passes through a size-selective inlet with a 50 % efficiency cutoff at 2,5 µm aerodynamic diameter

[SOURCE: ISO 29464:2024, 3.2.126]

3.7
particulate matter
PM_{10}
particulate matter which passes through a size-selective inlet with a 50 % efficiency cutoff at 10 µm aerodynamic diameter

[SOURCE: ISO 29464:2024, 3.2.125]

4 Test dusts designation

Load test dusts belong to one of the categories, according to the composition, the particle median diameter and the particle density, as shown in Table 1. The median diameter in Table 1 refers to the volume distribution. For more information on physical data and size distributions, refer to Annex A.

Table 1 — Load test dusts

Categories	Composition	Median diameter µm	Density g/cm^3
L1	Mixture of: — Arizona desert sand 72 % — Carbon 23 % — Milled cotton linters 5 %	 Conforms to ISO 12103-1, A2 fine test dust 0,101 Not defined	 Conforms to ISO 12103-1, A2 fine test dust Not defined Not defined
L2	Arizona desert sand	Conforms to ISO 12103-1, A2 fine test dust	Conforms to ISO 12103-1, A2 fine test dust
L3	KANTO loam (sintered)	1,7 to 2,5	2,9 to 3,1 (for reference)

Key
L1 Test dust is the same as the commercially available dust used for ANSI/ASHRAE 52.2 testing.
L2 Test dust is the same as ISO 12103-1, A2 fine test dust.
L3 Test dust is the same as APPIE SAP Test Powders 3 Class 3 (STP3-3) (Sintered KANTO loam) which is based on APPIE Standard SAP 14-12: Standard of Association of Powder Process Industry and Engineering, Japan.
L4 Test dust is the same as ANSI/AHRI 680 (I-P).
L5 Titanium dioxide

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