BSI Standards Publication

Workplace exposure — Measurement of the dustiness of bulk materials

Part 3: Continuous drop method

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National foreword

This British Standard is the UK implementation of EN 15051-3:2025. It supersedes BS EN 15051-3:2013, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EH/2/2, Work place atmospheres.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Exposition sur les lieux de travail - Mesurage du pouvoir de resuspension des matériaux en vrac - Partie 3 : Méthode de la chute continue

Exposition am Arbeitsplatz - Messung des Staubungsverhaltens von Schüttgütern - Teil 3: Verfahren mit kontinuierlichem Fall

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European foreword

This document (EN 15051-3:2025) has been prepared by Technical Committee CEN/TC 137 “Assessment of workplace exposure to chemical and biological agents”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2026, and conflicting national standards shall be withdrawn at the latest by May 2026.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 15051-3:2013.

EN 15051-3:2025 includes the following significant technical changes with respect to EN 15051-3:2013:

— the introduction was revised to better explain the purpose of dustiness testing;

— 4.3: Change in the tolerance of relative humidity (RH): Previously, RH was specified at (50 ± 10) % RH; now, it is specified at (50 ± 5) %;

— 5.8: Limit of detection (LOD) and limit of quantification (LOQ) has been added for the determination and reporting of LOD and LOQ of the weighing of the filters, and the 80 ppi and 20 ppi foams.

EN 15051 Workplace exposure – Measurement of the dustiness of bulk materials consists of the following parts:

— *Part 1: Requirements and choice of test methods;*

— *Part 2: Rotating drum method;*

— *Part 3: Continuous drop method.*

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

This document gives details of the design and operation of the continuous drop test method that categorizes the dustiness of solid bulk materials, in terms of health-related mass fractions.

The dustiness values of a specific method can be used for comparing and ranking powders and are useful for the purpose of safety by design and risk assessment. A dustiness categorization is presented to provide users (e.g. manufacturers, producers, occupational hygienists and workers) with information on the potential for dust emissions when the bulk material is handled or processed in workplaces. It provides the manufacturers of bulk materials with information that can help to improve their products. It allows the users of the bulk materials to assess the effects of pre-treatments, and also to select less dusty products, if available. It is envisaged that different branches of industry might develop their own categorization schemes using experimentally determined dustiness values of the bulk materials of interest.

However, dustiness test methods measure dust at emission source and does not consider the transportation of the airborne particles within a workplace environment to the breathing zone of a worker. Concentrations of respirable or inhalable dust in the workplace air, resulting from the processing and handling of bulk materials, will depend on a wide variety of factors (e.g. environmental factors, quantity used, engineering controls, transport of particles from source to worker's breathing zone, type of activities). Therefore, dustiness values do not provide workplace exposure concentrations.

Although this document does not discuss in detail the analysis of dust released from bulk materials (except in terms of health-related fractions), the test method produces samples with the potential for chemical analysis of the contents. However, it is important to understand that for a mixture, the mass percentage of a substance in the bulk material will be different (lower or higher) to the mass percentage of the same substance in the dust collected by the respirable and inhalable samplers using the continuous drop.

The EN 15051 standard was originally developed in 2006 based on the results of the European project SMT4-CT96-2074 Development of a Method for Dustiness Testing (see [1]). This project investigated the dustiness of 12 bulk materials, with the intention to test as wide a range of bulk materials as possible, i.e. magnitude of dustiness, industrial sectors, chemical composition and particle size distribution. In 2013, the standard was revised based on comments from industrial users of the standard (e.g. Industrial Minerals Association), a number of research papers (for example, [2] and [3]) and the potential influence of the expanding database of dustiness results.

For the measurement of dustiness of bulk materials that possibly contain or release nano-objects and their agglomerates and aggregates (NOAA) using the continuous drop method, EN 17199-1 and EN 17199-3 apply [8, 9].

1 Scope

This document specifies the continuous drop test apparatus and associated test method for the reproducible production of dust from a bulk material under standard conditions, and the measurement of the inhalable and respirable dustiness mass fractions, with reference to existing documents, where relevant (see Clause 6).

The continuous drop method intends to simulate dust generation processes where there are continuous falling operations (conveying, discharging, filling, refilling, weighing, sacking, metering, loading, unloading etc.) and where dust is liberated by winnowing during falling. It can be modified to measure the thoracic fraction as well, but this modification is not specified in this document. It differs from the rotating drum method presented in EN 15051-2 [4] in that in this document, the bulk material is dropped only once, but continuously, while in EN 15051-2, the same bulk material is repeatedly dropped.

Furthermore, this document specifies the environmental conditions, the sample handling and analytical procedures and the method of calculating and presenting the results. A categorization scheme for dustiness is specified, to provide a standardized way to express and communicate the results to users of the bulk materials.

This document is applicable to powdered, granular or pelletised bulk materials.

This document does not apply to test the dust released when solid bulk materials are mechanically treated (e.g. cut, crushed).

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.

EN 1540, *Workplace exposure — Terminology*

EN 13205-1, *Workplace exposure — Assessment of sampler performance for measurement of airborne particle concentrations — Part 1: General requirements*

EN 15051-1:2025, *Workplace exposure — Measurement of the dustiness of bulk materials — Part 1: Requirements and choice of test methods*

EN ISO 13137, *Workplace atmospheres — Pumps for personal sampling of chemical and biological agents — Requirements and test methods (ISO 13137)*

ISO 2768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

ISO 15767, *Workplace atmospheres — Controlling and characterizing uncertainty in weighing collected aerosols*