



BSI Standards Publication

Workplace exposure — Measurement of the dustiness of bulk materials

Part 1: Requirements and choice of test methods

National foreword

This British Standard is the UK implementation of EN 15051-1:2025. It supersedes BS EN 15051-1:2013, which is withdrawn.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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English Version

Workplace exposure - Measurement of the dustiness of bulk materials - Part 1: Requirements and choice of test methods

Exposition sur les lieux de travail - Mesurage du pouvoir de resuspension des matériaux en vrac - Partie 1 : Exigences et choix des méthodes d'essai

Exposition am Arbeitsplatz - Messung des Staubungsverhaltens von Schüttgütern - Teil 1: Anforderungen und Auswahl der Prüfverfahren

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European foreword

This document (EN 15051-1:2025) 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of an identical text or by endorsement, at the latest by May 2026, and conflicting national standards shall be withdrawn at the latest by May 2026.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 15051-1:2013.

EN 15051-1:2025 includes the following significant technical changes with respect to EN 15051-1:2013:

- the introduction was revised to better explain the purpose of dustiness testing;
- 5.1: a schematic overview of the test procedure has been added;
- 5.8: information about an in-house / test powder has been added;
- Annex C: an example of a suitable powder for quality purposes (Sphერiglass 5000 CP00) has been added.

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.

EN 15051-2 and EN 15051-3 give details of two test apparatus and test methods for the reproducible production of dust from a bulk material under standard conditions, and the measurement of the inhalable, thoracic and respirable fractions of this dust, with reference to the existing European standards, where relevant (see Clause 6).

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

The control of dust emissions during the handling and transportation of bulk materials is an important consideration in the design and operation of many industrial processes. Excessive airborne dust levels in workplaces are undesirable for several reasons:

- they can cause adverse health effects to the workers;
- their control can involve the use of costly ventilation and filtration systems;
- they can contaminate machinery and products;
- they can be costly in terms of product losses.

It is therefore advantageous for occupational hygienists and process engineers to have relevant information about the propensity of bulk materials to release airborne particles (i.e. dust) (the “dustiness” of the bulk material) so that risks can be evaluated, controlled and minimized.

Dustiness testing measures the propensity of a bulk materials e.g. powder to become airborne in response to a mechanical stimulus. Dustiness is a relative term and the measurement obtained will depend on specified method parameters including: the test apparatus used (design and volume), the mechanical stimulus and energy level applied, the condition and properties of the tested bulk material, the amount of bulk material tested (volume or mass), the sampling duration or volume of air sampled and various environmental variables (e.g. relative humidity, temperature and electrostatic effects). If one changes the extent of one or more method parameters then the outcome (e.g. dustiness values) can change significantly. The test and the variables therefore need to be closely specified to ensure reproducibility.

A single method of dustiness testing is unlikely to represent and reproduce the many types of processing and handling used in industry. This has meant that a number of bespoke methods have been developed and used in some industry sectors but are limited in their scope and application and were not designed to measure and express results in terms of the health-related fractions: i.e. inhalable, thoracic and respirable, as defined in EN 481. Therefore, a clear need for a European Standard was presented, leading to the initial publication of EN 15051 as a single document in 2006. In 2013, the standard was restructured into three separate parts: EN 15051-1, which outlines general requirements, and two test methods. EN 15051-2 (rotating drum test) and EN 15051-3 (continuous drop test) were designed to simulate two of the main handling methods: small-scale repeated discreet handling (e.g. shovelling, dispensing, batch preparation and weighing etc.) and larger scale conveyancing of bulk dust into silos and hoppers. EN 15051-2 separates the airborne dust into the three health related fractions using porous foams and EN 15051-3 measures the respirable fraction using a well-characterized cyclone sampler.

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 important 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.

The level of the dustiness generally depends on material-specific and process-specific parameters. The most important material-specific parameters are:

- the particle size distribution of the bulk material;
- its bulk density;
- its moisture content (“bulk material moisture content”);