



SLOVENSKI STANDARD
oSIST prEN 15051-1:2024
01-julij-2024

**Izpostavljenost na delovnem mestu - Meritve prašnosti razsutih materialov - 1. del:
Zahteve in izbira preskusnih metod**

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

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

Exposition sur les lieux de travail - Mesurage du pouvoir de resuspension des matériaux
pulvérulents en vrac - Partie 2 : Méthode du tambour rotatif

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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 pulvérulents
en vrac - Partie 2 : Méthode du tambour rotatif

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Staubungsverhaltens von Schüttgütern - Teil 1:
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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 137.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword	3
Introduction	4
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Principles	7
5 General Procedures	7
5.1 Schematic overview of the procedure	7
5.2 Conditioning of the bulk material	9
5.2.1 As-received condition	9
5.2.2 Conditioning specifications	9
5.3 Sample and environmental control	9
5.4 Taking samples from the bulk material	9
5.5 Moisture content	10
5.6 Bulk density	10
5.7 Test procedure	10
5.8 Replicate tests	10
5.9 In-house / test powder	10
5.10 Reporting	10
6 Choice of test methods	10
6.1 General	10
6.2 Selection of the most appropriate test method	11
7 Evaluation of dustiness	11
8 Test report	12
Annex A (normative) Determination of moisture content	13
Annex B (normative) Determination of bulk density of the test material	15
Annex C (informative) Spheriglass 5000 CP00 – An example of a suitable powder for quality purposes	16
Bibliography	17

European foreword

This document (prEN 15051-1:2024) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 15051-1:2013.

prEN 15051-1:2024 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;
- Clause 5.1: a schematic overview of the test procedure has been added;
- Clause 5.8: information about an in-house / test powder has been added;
- Annex C: an example of a suitable powder for quality purposes (Spheriglass 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).

<https://standards.iteh.ai/catalog/standards/sist/28fb9fb9-9cb3-4671-b4d5-0d7c469d5619/osist-pren-15051-1-2024>

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 defined 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 standard was presented and EN 15051-1 was published in 2013. The standard series included two test methods; EN 15051-2 (rotating drum test) and EN 15051-3 (continuous drop test), 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.

This document was originally developed 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. The first revision considered 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. In this revised version, the performance and characteristics of the metal foams for the sampling of the respirable fraction and important comments from industrial users of the standard have been taken into account.

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;