



SLOVENSKI STANDARD SIST EN 50632-1:2015

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Elektromotorna orodja - Postopek meritve prahu - 1. del: Splošne zahteve

Electric motor-operated tools - Dust measurement Procedure - Part 1: General requirement

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EUROPEAN STANDARD

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English Version

Electric motor-operated tools - Dust measurement Procedure - Part 1: General requirements

Outils électriques à moteur - Procédure de mesure de la
poussière - Partie 1: Exigences générales

Motorbetriebene Elektrowerkzeuge - Staubmessverfahren -
Teil 1: Allgemeine Anforderungen

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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European foreword

This document (EN 50632-1:2015) has been prepared by CLC/TC 116 "Safety of motor-operated electric tools".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-08-03
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2017-08-03

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

This European Standard is divided into three parts:

Part 1: General requirements for the dust measurement which are common to electric motor-operated tools (for the purpose of this standard referred to simply as tools).

Part 2 or 3: Requirements for the dust measurement for particular types of tools, which either supplement or modify the requirements given in Part 1 to account for the particular characteristics of these specific tools.

This Part 1 is to be used in conjunction with the appropriate Part 2 or 3 which contains clauses that supplement or modify the corresponding clauses in Part 1 to provide the relevant requirements for each type of product.

The following print types are used:

- requirements; in roman type
- *test specifications: in italic type;*
- notes: in smaller roman type.

The terms defined in Clause 3 are printed in **bold typeface**.

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Introduction

Inhalable dust emitted by electric motor-operated tools may present a hazard to the operator and other exposed persons.

Therefore, this standard specifies a procedure how to measure the **dust** concentration produced by an electric power tool under standardized conditions representing typical applications. However, the **dust** concentration during actual use of the power tool may differ from the **dust** concentration measured in accordance with this standard depending on the ways in which the tool is used.

The results of **dust** measurements can be used:

- for a declaration of the **dust** emission;
- for comparing the **dust** emission from tools of the same type;
- in a preliminary assessment of **dust** exposure at a workplace.

For all purposes, it is important to specify measurement procedures with known accuracy so that the results of measurements taken by different laboratories can be compared.

The measurements of **dust** concentration are made in accordance with the standard EN 1093-9 for the test room.

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1 Scope

1.1 General

This European Standard specifies general requirements for the **dust** measurement of electric motor-operated tools supplied from mains or from batteries. This European Standard applies to those tools with and without **dust extraction unit** where **dust** such as mineral **dust** containing silica or wood **dust** is expected.

1.2 Types of dust

Dust is a disperse distribution of solid substances in gases, particularly air, resulting from mechanical processes. According to EN 481, two size categories are to be differentiated: the **inhalable dust** and the **respirable dust** fraction. **Inhalable dust** refers to the entire inhalable fraction of the **dust** through mouth and/or nose. **Respirable dust** relates to the fraction of the **inhalable dust** that can reach the pulmonary alveoli due to its small particle size.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 481, *Workplace atmospheres - Size fraction definitions for measurement of airborne particles*

EN 1093-9, *Safety of machinery – Evaluation of the emission of airborne hazardous substances – Part 9: Pollutant concentration parameter, room method*

EN 13205 (all parts), *Workplace exposure – Assessment of sampler performance for measurement of airborne particle concentrations*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

dust

distribution of solid materials in gases, generated by mechanical processes

3.2

inhalable dust

dust fraction which can be taken up over the respiratory system in accordance with EN 481

3.3

respirable dust

dust fraction which can reach the alveoli and bronchia in accordance with EN 481

3.4

dust sampler

device for collecting the **respirable** and **inhalable dust** portion by aspirating a measured amount of **dust**-laden air and deposition of the **dust** on an integrated filter

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3.5

dust extraction unit

suction device, connected to the **dust**/chip outlet of the tool or a **dust** capturing attachment, for collecting **dust** emitted from the tool during working, being either an external one (such as a **dust** extractor or a centralized exhaust system) or an integral one

3.6

quartz

mineral derived from crystalline silica

3.7

maximum air flow rate

maximum air flow rate, delivered by an external **dust extraction unit**, including the specified hose, no tool attached

3.8

maximum vacuum

maximum vacuum level, delivered by an external **dust extraction unit**, including the specified hose with end of hose blocked and no bypass

4 Test procedure

4.1 General

Tests are performed under working conditions, including appropriate rest periods, in the test room similar to the one used in EN 1093-9, and measurements of **dust** emission are made in accordance with that standard.

The **inhalable dust** shall be measured and analysed. For tools intended to be used with materials likely to contain **quartz**, also the **respirable dust** shall be measured and analysed.

The operator shall be skilled and able to operate the machine properly, i.e. the operator shall be experienced in the use of the tool.

4.2 Test room and equipment

The tests are carried out in a test room that fulfils the following criteria:

- no other sources of fixed air-polluting material in the room;
- no room ventilation during the **dust** measurement;
- size of the room $200 \text{ m}^3 \pm 10 \%$ with a height between 3,0 m and 4,5 m;
- large enough to ensure a distance between the tool and the walls of at least 2,0 m.

NOTE A smaller distance can lead to higher values of the measured **dust** concentration.

During the test, (a) **dust sampler(s)** is (are) carried by the operator on the upper chest zone. For the **respirable dust**, one **dust sampler** shall be used on each side of the upper chest zone. If the tests are done by robotic means, the **dust sampler(s)** shall be placed at a place to replicate the upper chest zone of an operator. The **dust sampler(s)** shall remain working throughout the entire time of each test as defined in 4.3.

The **dust sampler(s)** shall comply with EN 13205 (all parts) and shall be suitable for the determination of the concentration of **inhalable dust** and, if required, for **respirable dust**, as specified in EN 481.

The test room, the air inside the test room and the equipment shall be cleaned before each test, so that there is no influence to the test result from previous tests.

4.3 Operating conditions

All tests shall be done at an ambient temperature of $(20^{\circ} \pm 5)$ °C and at a relative ambient humidity of maximum 75 %.

For tools to be used in combination with an external **dust extraction unit**, the tool is connected to the **dust extraction unit** as specified by the manufacturer.

Every test consists of five test cycles of 10 min working time and 2 min rest time each, in total a test time of 1 h. During each test, a given task shall be achieved as specified in the relevant Part 2 or Part 3. Depending on the detection limit of the used **dust sampler(s)** and of the **dust** concentration to be determined, a total test time longer than 1 h may be necessary. This shall be achieved by adding a sufficient number of additional test cycles, so that the relative detection limit of the **dust sampler(s)** is lower than the **dust** concentration to be determined. The task specified in the relevant Part 2 or Part 3 shall be adapted to the altered test time.

The **dust extraction unit** shall be maintained and operated as specified by the manufacturer's instruction manual, and it shall be placed in the test room.

- Emptying of an external **dust extraction unit** shall be done in accordance with the instruction manual of the external **dust extraction unit**, but at the earliest after three test cycles. Any emptying shall be done during a rest period of a test cycle and outside the test room.

NOTE Examples for instructions in a manual are requests to obey the warning signal of a class M **dust** extractor or to keep the air flow in a certain range.

- Integral **dust extraction units** are changed or emptied in accordance with the instruction manual. This may be done in shorter intervals. If necessary, the test may be split into 10 test cycles of 5 min working time and 1 min rest time. Changing or emptying of the **dust** container shall be done inside of the test room.

If the instruction manual of the power tool requires a certain air flow rate or an air flow rate range then this air flow rate or the minimum value of an air flow rate range shall be adjusted for the **dust** measurement within a tolerance of $\begin{matrix} +10 \\ -0 \end{matrix}$ %.

The amount of **dust** collected by the **dust extraction unit** shall be determined by weighing the **dust extraction unit**, collection unit or the like before starting working, before each emptying and after the test.

The tool shall be operated under working conditions. The material used for the test shall be appropriate for the intended use of the tool. The tool bit/cutter/abrasive etc. to be used shall be as specified by the manufacturer for the material to be worked.

Tests shall be carried out at rated voltage and frequency and at maximum speed setting, if any. The maximum speed setting also applies, if the specification of a Part 2 or Part 3 cannot be achieved due to missing information in the manufacturer's instructions.

The tool and the workpiece shall be placed inside the test room so that the distance between the tool and the walls/ceiling is at least 2,0 m.

Three tests shall be carried out. The result shall be one concentration value for each test and **dust** type. For the **respirable dust**, the mean value of the two **dust samplers** at the operator shall be taken. The **dust sampler(s)** shall operate during the entire time needed for each of the three tests.