

INTERNATIONAL STANDARD

**Electric motor-operated tools – Dust measurement procedure –
Part 2-4: Particular requirements for hand-held sanders**

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**Electric motor-operated tools – Dust measurement procedure –
Part 2-4: Particular requirements for hand-held sanders**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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DUST MEASUREMENT PROCEDURE –****Part 2-4: Particular requirements for hand-held sanders****FOREWORD**

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IEC 63241-2-4 has been prepared by IEC technical committee 116: Safety of motor-operated electric tools. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
116/799/FDIS	116/822/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This document is to be used in conjunction with the first edition of IEC 63241-1:2023.

This document supplements or modifies the corresponding clauses in IEC 63241-1, so as to convert it into the IEC Standard: *Electric motor-operated tools – Dust measurement procedure – Particular requirements for hand-held sanders*.

Where a particular subclause of IEC 63241-1 is not mentioned in this document, that subclause applies as far as relevant. Where this document states "addition", "modification" or "replacement", the relevant text in IEC 63241-1 is to be adapted accordingly.

The following print types are used:

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

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

Subclauses, notes, tables and figures which are additional to those in IEC 63241-1 are numbered starting from 101.

A list of all parts in the IEC 63241 series, published under the general title *Electric motor-operated tools – Dust measurement procedure*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 36 months from the date of publication.

ELECTRIC MOTOR-OPERATED TOOLS DUST MEASUREMENT PROCEDURE –

Part 2-4: Particular requirements for hand-held sanders

1 Scope

IEC 63241-1:2023, Clause 1 is applicable, except as follows:

Addition:

This document applies to **sanders** with the exception of all types of rotating disc-type sanders, which are covered by IEC 63241-2-3¹.

2 Normative references

IEC 63241-1:2023, Clause 2 is applicable, except as follows:

Addition:

IEC 63241-1:2023, *Electric motor-operated tools – Dust measurement procedure – Part 1: General requirements*

EN 12859:2011, *Gypsum blocks – Definitions, requirements and test methods*

3 Terms and definitions

IEC 63241-1:2023, Clause 3 is applicable, except as follows:

Addition:

3.101

sander

tool intended to remove surface material using an abrasive medium

3.102

orbital sander

sander equipped with a plate, which performs an orbital oscillating motion parallel to the work surface

3.103

random orbit sander

sander equipped with a plate positioned eccentrically on the driving spindle which can rotate freely around its axis parallel to the work surface

¹ Under preparation. Stage at the time of publication: IEC FDIS 63241-2-3:2024.

3.104**reciprocating sander**

sander equipped with a plate, which performs a reciprocating motion parallel to the work surface

3.105**belt sander**

sander equipped with an endless abrasive belt

4 Test procedure

IEC 63241-1:2023, Clause 4 is applicable, except as follows:

4.3 Operating conditions

Addition:

Orbital sanders and random orbit sanders intended to process mineral materials are tested under load observing the conditions shown in Table 101.

Table 101 – Operating conditions for sanders when sanding gypsum blocks

Material and set-up	<p>Gypsum blocks made of 100 % calcium sulfate dihydrate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) with a density of minimum $1\,250 \text{ kg/m}^3$ (high density, designation as D – dense) and a minimum hardness of 80 Shore C units in accordance with EN 12859:2011. The gypsum blocks shall be stored in a dry environment for at least two weeks prior to testing, with a distance of at least one block thickness between each of them. Gypsum blocks with suitable dimensions and a thickness of approximately 100 mm are placed on an A-support, see Figure 102, with 15° inclination and the lower workpiece support being $(500 \pm 50) \text{ mm}$ above the floor. The blocks are arranged without gaps to achieve an area of approximately 4 m in length and 1,5 m in height, see Figure 101.</p> <p>For each tested tool, new blocks of gypsum shall be used and replaced latest when either</p> <ul style="list-style-type: none"> – the gypsum blocks are sanded down to the surface of the supporting plate; or – the gypsum blocks are broken; or – pieces of the gypsum blocks are thrown out.
Orientation and operation	<p>The gypsum blocks are sanded. During sanding, the sanding paper shall be at least 50 mm away from the edges of the total block area.</p> <p>During sanding, the sanding paper shall be parallel to the surface of the gypsum block.</p>
Tool bit/settings	<p>Sanding paper or grinding grid with a grain P80, suitable for the material gypsum. The sanding paper is replaced after each test cycle.</p> <p>Speed setting devices, if any, shall be adjusted to maximum speed.</p>
Feed force	<p>The feed force applied to the tool shall be sufficient to ensure stable operation with good performance.</p>
Test	<p>During the entire test, a minimum of</p> <ul style="list-style-type: none"> – 1 500 g, for orbital sanders and random orbit sanders with a sanding plate diameter up to and including 140 mm; or – 2 000 g, for orbital sanders and random orbit sanders with a sanding plate diameter above 140 mm <p>of material shall be collected in the dust extraction unit.</p> <p>The above requirement for the minimum amount of material is not applicable for sanders with a sanding plate surface less than 100 cm^2, such as in delta form.</p> <p>The weight of the material collected may be determined as the weight increase of the dust extraction unit by means of scales.</p>

Sanders intended for sanding wood are tested under load observing the conditions shown in Table 102.

Table 102 – Operating conditions for sanders when sanding wood

Material and set-up	<p>For orbital sanders, random orbit sanders and reciprocating sanders: beech wood, (500 ± 2) mm \times (500 ± 2) mm, with a thickness sufficient for three complete tests.</p> <p>For belt sanders: beech wood, length = (500 ± 2) mm, approximate width = width of the sanding belt minus 15 mm, with a thickness sufficient for three complete tests.</p> <p>At the beginning of the test, the wood shall have a humidity of maximum 12 %. The workpiece is mounted horizontally on a bench with a working height matching the requirement for the vertical distance between the upper surface of the workpiece and the intake openings of the dust samplers as specified in 4.2.</p>
Orientation and operation	Uniform sanding of the complete surface.
Tool bit/settings	<p>Sanding paper with a grain of P80, suitable for wood. The sanding paper is replaced after each test cycle.</p> <p>Speed setting devices, if any, shall be adjusted to maximum speed.</p>
Feed force	<ul style="list-style-type: none"> – (30 ± 5) N, if the mass of the tool is less than 1,5 kg; – (50 ± 5) N, if the mass of the tool is equal to or greater than 1,5 kg.
Test	<p>Uniform sanding during working time.</p> <p>If sanders with integral dust extraction units are used, the dust container shall be changed on one-way systems or emptied on multiple-use systems dependent on its capacity, but at the latest after the third test cycle of each test. The emptying of multiple-use dust extraction units shall be done in the test room, in accordance with the manufacturer's instructions.</p>

Sanders intended for sanding a wooden floor are tested under load observing the conditions shown in Table 103.

Table 103 – Operating conditions for sanders when sanding a wooden floor

Material and set-up	<p>Oak (strip parquet) on the floor of the test room: approximately 3 000 mm \times 2 000 mm, with a thickness sufficient for three complete tests.</p> <p>Parquet surface pre-sanded, oak wood with a maximum humidity of 12 %.</p> <p>Sanders intended for sanding along a wall: a three-sided moveable frame, (300 ± 2) mm high, with a size approximately 2 000 mm \times 1 000 mm is prepared and used.</p>
Orientation and operation	<p>Sanders intended for surface sanding: uniform sanding of the complete working area by constant moving of the tool with a speed of 20 m/min to 25 m/min.</p> <p>Sanders intended for sanding along a wall: uniform sanding along the complete border (back and forth movement). The frame is moved after each test cycle to another area on the parquet to avoid excessive wear.</p>
Tool bit/settings	<p>Aluminium oxide sanding paper with a grain of P80, suitable for wood. The sanding paper is replaced after each test cycle.</p> <p>Speed setting devices, if any, shall be adjusted to maximum speed.</p>
Feed force	The sander is moved without additional load.
Test	<p>Uniform sanding during working time.</p> <p>If sanders with integral dust extraction units are used, the dust container shall be changed on one-way systems or emptied on multiple-use systems dependent on its capacity but latest after the third test cycle of each test. The emptying of multiple-use dust extraction units shall be done in the test room, in accordance with the manufacturers' instructions.</p>

5 Instrumentation

IEC 63241-1:2023, Clause 5 is applicable.

6 Information to be reported

IEC 63241-1:2023, Clause 6 is applicable, except as follows:

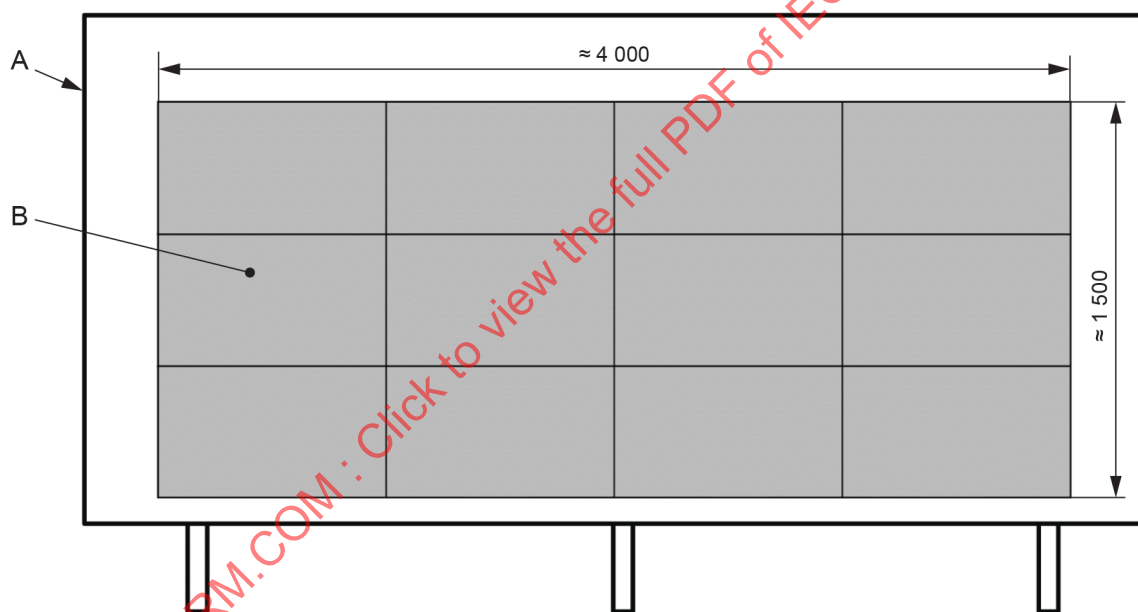
Replacement of item c):

- c) information about the material used for the test (such as type, manufacturer, composition, hardness);

Replacement of item j):

- j) for every operating condition required by this document: mean value in mg/m^3 , calculated from all **dust samplers** for the same **dust** fraction and all three tests for the concentration of the **inhalable dust** and the **respirable dust**;

Dimensions in millimetres



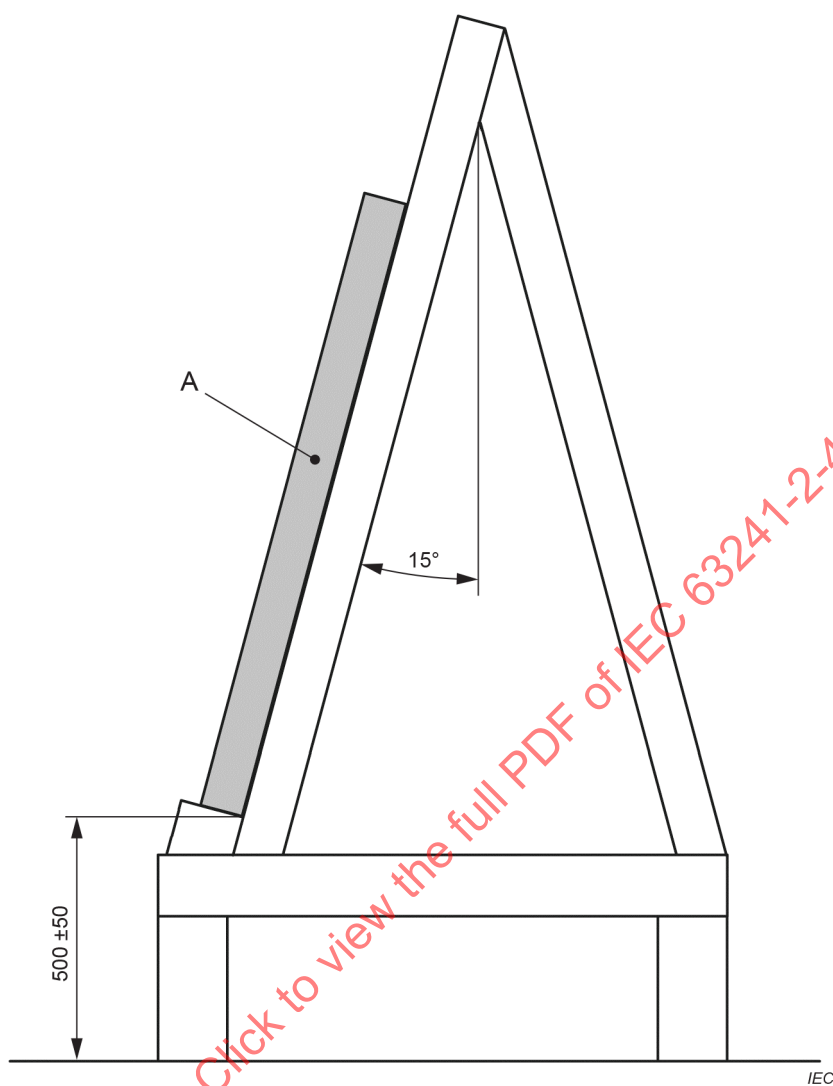
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Key

- A A-support
- B workpiece (gypsum blocks)

Figure 101 – Test set-up for sanding gypsum blocks

Linear dimensions in millimetres

**Key**

A workpiece

Figure 102 – A-support