IEC 62841-2-4

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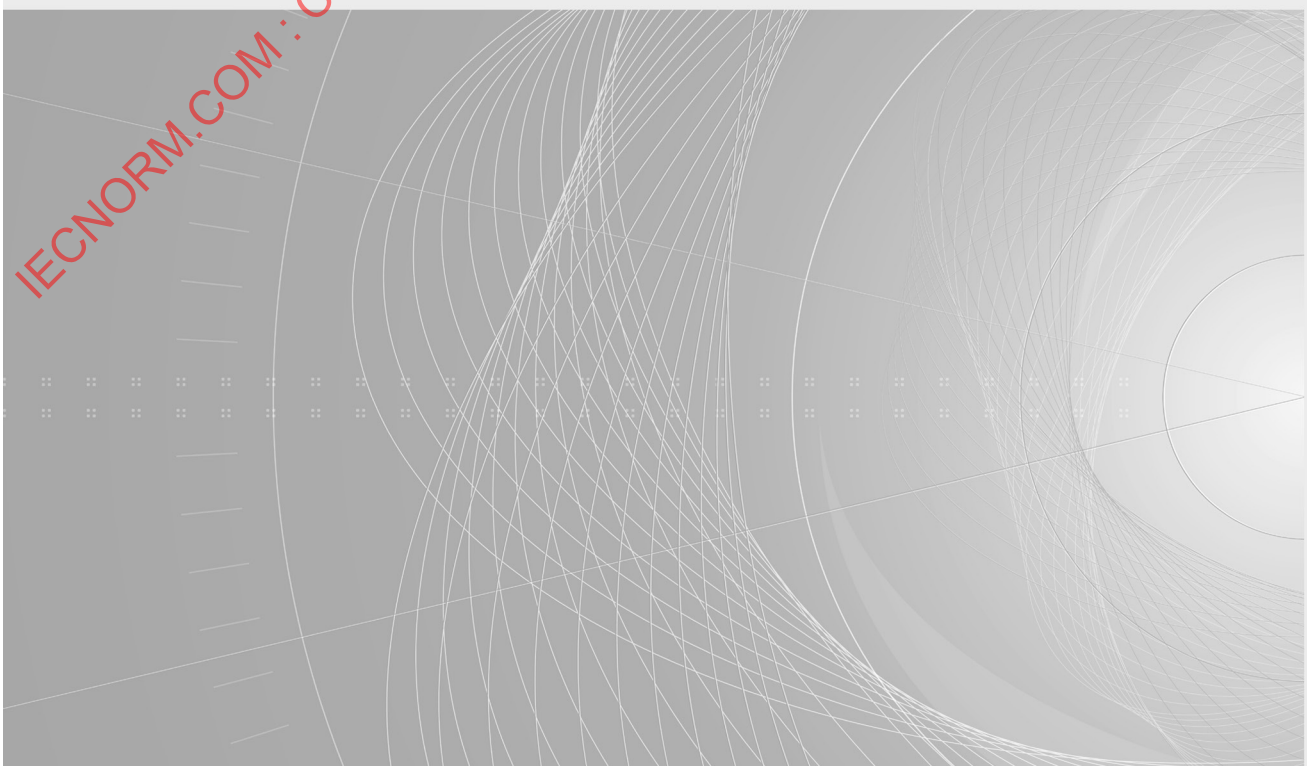
CONSOLIDATED VERSION

INTERNATIONAL STANDARD

Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety –
Part 2-4: Particular requirements for hand-held sanders and polishers other than disc type



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INTERNATIONAL
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COMMISSION

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRIC MOTOR-OPERATED HAND-HELD TOOLS, TRANSPORTABLE TOOLS AND LAWN AND GARDEN MACHINERY – SAFETY –

Part 2-4: Particular requirements for hand-held sanders and polishers other than disc type

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red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 62841-2-4 has been prepared by IEC technical committee 116: Safety of motor-operated electric tools.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This Part 2-4 is to be used in conjunction with the first edition of IEC 62841-1 (2014).

This Part 2-4 supplements or modifies the corresponding clauses in IEC 62841-1, so as to convert it into the IEC Standard: Particular requirements for hand-held sanders and polishers other than disc type.

Where a particular subclause of Part 1 is not mentioned in this Part 2-4, that subclause applies as far as reasonable. Where this standard states “addition”, “modification” or “replacement”, the relevant text in Part 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 and figures which are additional to those in Part 1 are numbered starting from 101.

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ELECTRIC MOTOR-OPERATED HAND-HELD TOOLS, TRANSPORTABLE TOOLS AND LAWN AND GARDEN MACHINERY – SAFETY –

Part 2-4: Particular requirements for hand-held sanders and polishers other than disc type

1 Scope

This clause of Part 1 is applicable, except as follows:

Addition:

This part of IEC 62841 applies to hand-held **sanders** and **polishers** with the exception of disc-type tools covered by IEC 62841-2-3.

Tools covered by this standard include but are not limited to **belt sanders**, **drum sanders** or **polishers**, **reciprocating sanders** or **polishers**, **orbital sanders** or **polishers**, and **random orbit sanders** or **polishers**.

2 Normative references

This clause of Part 1 is applicable.

3 Terms and definitions

This clause of Part 1 is applicable, except as follows:

Addition:

3.101
sander
tool intended to remove surface material using an abrasive medium

3.102
polisher
tool equipped with a disc or pad intended for polishing

3.103
belt sander
sander equipped with an endless abrasive belt

3.104
drum sander or polisher
sander or **polisher** equipped with a rotating cylindrical working surface, oriented either inline or at an angle with the motor axis

Note 1 to entry: **Drum polishers** are also known as burnishing machines.

Note 2 to entry: **Drum sanders** with a drum in line with the axis of the motor are also known as spindle sanders or inline sanders.

3.105
orbital sander or polisher
sander or **polisher** equipped with a plate, which performs an orbital oscillating motion parallel to the work surface

Note 1 to entry: Orbital sanders or polishers are also known as oscillating sanders or polishers

3.106
random orbit sander or polisher
sander or **polisher** equipped with a plate positioned eccentrically on the driving spindle which can rotate freely around its axis parallel to the work surface

3.107
reciprocating sander or polisher
sander or **polisher** equipped with a plate which performs a reciprocating motion parallel to the work surface

4 General requirements

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable, except as follows:

5.17 *Addition:*

The mass of the tool includes the dust extraction adapter, if any.

6 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

7 Classification

This clause of Part 1 is applicable.

8 Marking and instructions

This clause of Part 1 is applicable, except as follows:

8.3 *Addition:*

For **belt sanders** and **drum sanders** and **polishers**, the direction of rotation shall be indicated on the tool by an arrow, raised or sunk, or by any other means no less visible and indelible.

8.14.1 *Addition:*

For **belt sanders and drum sanders**, the additional safety instructions as specified in 8.14.1.101 shall be given. This part may be printed separately from the “General Power Tool Safety Warnings”.

8.14.1.101 Belt sander and drum sander safety warnings

Hold the power tool by insulated gripping surfaces, because the sanding surface may contact its own cord. *Cutting a "live" wire may make exposed metal parts of the power tool "live" and could give the operator an electric shock.*

9 Protection against access to live parts

This clause of Part 1 is applicable.

10 Starting

This clause of Part 1 is applicable.

11 Input and current

This clause of Part 1 is applicable.

12 Heating

This clause of Part 1 is applicable.

13 Resistance to heat and fire

This clause of Part 1 is applicable.

14 Moisture resistance

This clause of Part 1 is applicable.

15 Resistance to rusting

This clause of Part 1 is applicable.

16 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

17 Endurance

This clause of Part 1 is applicable, except as follows:

17.2 *Replacement of the third paragraph, except for* ***belt sanders*** *and* ***drum sanders*** *and* ***polishers****:*

Orbital sanders *and* ***polishers****,* ***random orbit sanders*** *and* ***polishers****, and* ***reciprocating sanders*** *and* ***polishers*** *are operated for 24 h at a voltage equal to 1,1 times the highest rated voltage or 1,1 times the upper limit of the rated voltage range, and then for 24 h at a supply voltage equal to 0,9 times the lowest rated voltage or 0,9 times the lower limit of the rated voltage range. The 24 h of operation need not be continuous. If applicable, the tool is adjusted to the maximum attainable speed.*

The tools are operated while the platen, fitted with abrasive paper in reverse position or a polishing bonnet as applicable, is resting under the weight of the tool on a steel plate. The abrasive paper should be replaced as required to avoid direct contact between platen and steel plate. These tools are only tested in the upright position where the platen is horizontal.

18 Abnormal operation

This clause of Part 1 is applicable, except as follows:

18.8 ~~**Table 4**~~ *Replacement of Table 4:*

Table 4 – Required performance levels

Type and purpose of SCF	Minimum performance level (PL)
Power switch – prevent unwanted switch-on for **belt sanders**, **drum sanders** and **drum polishers**	b
~~**Power switch** – prevent unwanted switch-on for **random orbit sanders** and **polishers**~~	~~a~~
Power switch – prevent unwanted switch-on for ~~other~~ **sanders** and **polishers** other than **belt sanders**, **drum sanders**, **drum polishers**	Not an **SCF**
Power switch – provide desired switch-off for **belt sanders**, **drum sanders** ~~and **polishers** and **random orbit sanders**~~ and **drum polishers**	b
Power switch – provide desired switch-off for ~~other~~ **sanders** and **polishers** other than **belt sanders**, **drum sanders** and **drum polishers**	Not an **SCF**
Provide desired direction of rotation for **belt sanders**, **drum sanders** and **drum polishers**	a
Any speed limiting device	Not an **SCF**
Prevent exceeding thermal limits as in ~~Clause~~ 18.4 and 18.5.3	a

19 Mechanical hazards

This clause of Part 1 is applicable, except as follows:

19.1 *Replacement of the first paragraph:*

Moving and dangerous parts other than the abrasive belt and belt rollers of **belt sanders** shall, as far as is compatible with the use and working of the tool, be so positioned or enclosed to provide adequate protection against personal injury. The requirements for the abrasive belt and belt rollers of **belt sanders** are specified in 19.1.101, 19.1.102 and 19.1.103.

19.1.101 **Belt sanders** shall be designed to minimise the risk due to the nip hazard from the roller closest to the operator without limiting the intended functionality of the tool.

Compliance is checked by the following tests 1 and 2.

1) *An test rod with 8 mm diameter, applied parallel to the axis of the roller, shall not be able to enter the in-feed nip between the roller and the abrasive belt. As the rod is attempted to be inserted into this area, the abrasive belt shall not be displaced in any way that would allow the entry of the rod. See Figure 101.*
2) *The abrasive belt is removed. A steel ball with 7 mm diameter is placed all along the in-feed gap between the intended belt contact surface of the roller and the belt housing enclosure with the tool turned upside down in the most unfavourable position, see*

Figure 102. The steel ball shall not move under its own weight into the gap between the roller and the belt housing beyond the line of complete passage as shown in Figure 102.

19.1.102 Belt sanders shall be designed to limit access to in-feed nip locations from roller(s) other than those closest to the operator without limiting the intended functionality of the tool.

In-feed nip locations are regarded to be located either

between the intended belt contact surface of the roller and the belt housing enclosure

or

between the intended belt contact surface of the roller and the abrasive belt.

Access shall be limited by either a) or b) as follows:

a) The chain distance between any in-feed nip location and the closest point on a handle or grasping surface identified in accordance with 8.14.2 b) 6) shall be at least 100 mm.

Compliance is checked by measurement.

~~a~~b) If a stick-type auxiliary handle is mounted to the side with its axis perpendicular to the direction of movement of the abrasive belt, it shall be provided with a flange having a height not less than 12 mm above the grasping surface between the grasping area and the in-feed nip location.

Compliance is checked by inspection and by measurement.

19.1.103 The ends of rollers that extend past the edge of the intended belt contact surface shall be smooth and free of sharp edges.

Compliance is checked by inspection.

19.6 This subclause is not applicable.

20 Mechanical strength

This clause of Part 1 is applicable, except as follows:

20.5 This subclause is not applicable for **sanders** and **polishers** except for **belt sanders** and **drum sanders**.

21 Construction

This clause of Part 1 is applicable, except as follows:

21.18.1 *Addition:*

~~For **sanders** other than **belt sanders** and **drum sanders**, power switches other than momentary power switches are permitted.~~

For

– **sanders** other than **belt sanders** and **drum sanders**; and
– **polishers** other than **drum polishers**,

power switches other than **momentary power switches** are permitted.

21.18.1.2 This subclause of Part 1 is not applicable.

Replace the existing text of the third dashed item of 21.35 with the following new text:

– other **sanders**, with a sanding contact surface exceeding 200 cm^2,

unless the tool is intended to process only metal in accordance with 8.14.2 b) 4) of Part 1.

21.30 This subclause is not applicable for **sanders** and **polishers** except for **belt sanders** and **drum sanders**.

21.35 This subclause is applicable for:

– **belt sanders** and **random orbit sanders** with a sanding contact surface exceeding 100 cm^2;
– **drum sanders** other than spindle sanders;
– other **sanders**, with a sanding contact surface exceeding 200 cm^2, unless they are intended to process only metal in accordance with 8.14.2 b) 4).

22 Internal wiring

This clause of Part 1 is applicable.

23 Components

This clause of Part 1 is applicable, except as follows:

23.3 This subclause of Part 1 is not applicable.

24 Supply connection and external flexible cords

This clause of Part 1 is applicable.

25 Terminals for external conductors

This clause of Part 1 is applicable.

26 Provision for earthing

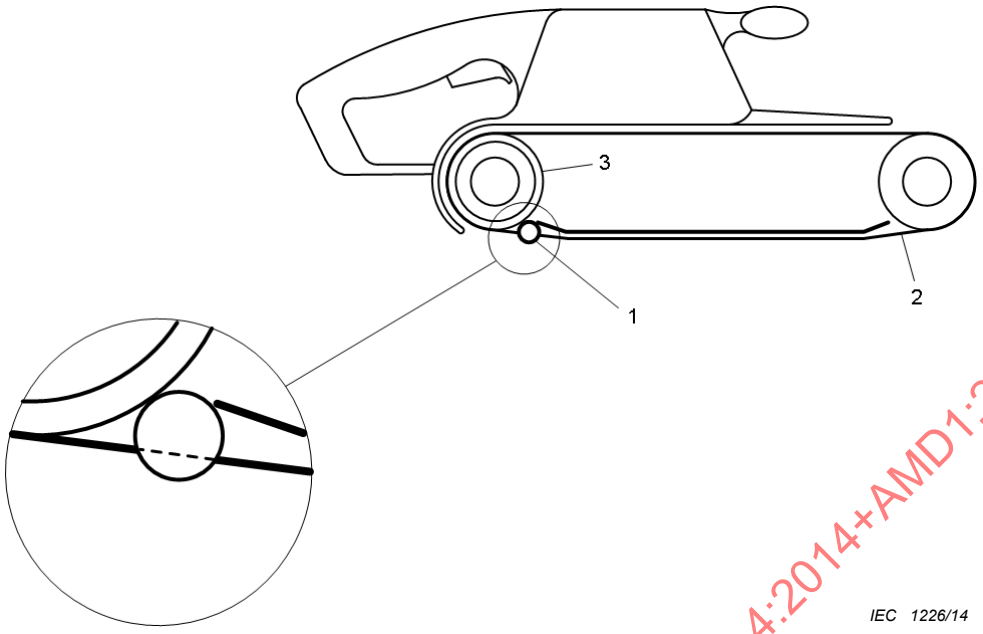
This clause of Part 1 is applicable.

27 Screws and connections

This clause of Part 1 is applicable.

28 Creepage distances, clearances and distances through insulation

This clause of Part 1 is applicable.



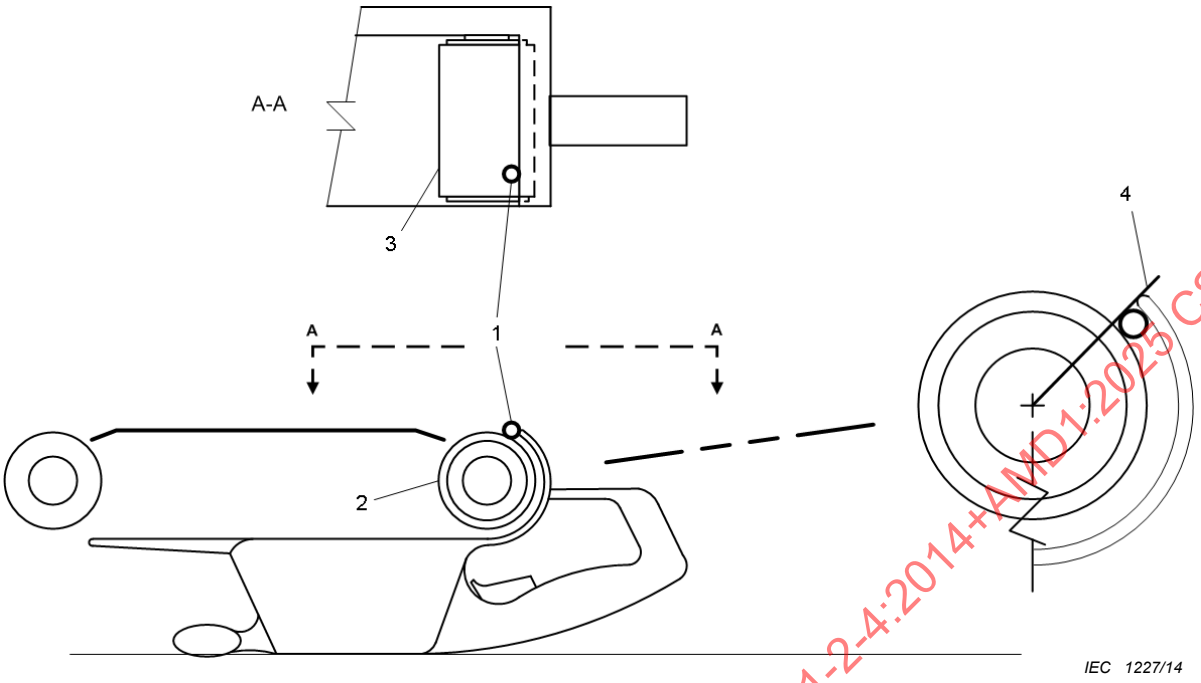
Key

1 rod with 8 mm diameter

2 abrasive belt

3 roller closest to the operator

Figure 101 – Rod test for the in-feed nip between the belt and roller



Key

1 steel ball with 7 mm diameter
2 roller closest to the operator
3 intended belt contact surface of the roller
4 line of complete passage

Figure 102 – Steel ball test for the in-feed nip between the belt housing enclosure and roller

Annexes

The annexes of Part 1 are applicable except as follows.

Annex I
(informative)

Measurement of noise and vibration emissions

I.2 Noise test code (grade 2)

This clause of Part 1 is applicable except as follows:

I.2.4 Installation and mounting conditions of the power tools during noise tests

Addition:

Sanders and **polishers** are suspended. The plate of the tool shall be horizontal.

I.2.5 Operating conditions

Addition:

Sanders and **polishers** are tested at no-load.

I.3 Vibration

I.3.3.2 Location of measurement

Addition:

Figure I.101 shows the positions for different **sanders** and **polishers**.

I.3.5.1 General

Addition:

For **battery**-operated tools, the tests are conducted with the lightest **battery** in accordance with K.8.14.2 e) 2) of Part 1 that has the capacity to complete the fifteen measurements as specified in I.3.6.1 of Part 1, under the operating conditions described in Table I.101 or Table I.102, as applicable.

I.3.5.3 Operating conditions

Addition:

Sanders and **polishers** are tested under load observing the conditions shown in Tables I.101 and I.102.

Table I.101 – Operating conditions for sanders

Orientation	Sanding a horizontal steel plate 400 mm × 400 mm × 20 mm mounted on a bench

Tool bit	Recommended sanding paper for steel with a grain size of 180
Feed force	Vertical force applied in addition to the weight of the tool: • 30 N ± 5 N, if the mass of the tool is less than 1,5 kg; • 50 N ± 5 N, if the mass of the tool is equal or greater than 1,5 kg; • or the force necessary to obtain rated input, whichever is the lower. For **battery**-powered **sanders**, the mass of the tool to select the feed force shall be the mass of the tool but not including any **detachable battery pack(s)** or **separable battery pack(s)**.
Pre-test requirements	With a new sanding sheet carry out 1 min sanding before starting measurements

Table I.102 – Operating conditions for polishers

Orientation	Polishing a horizontal steel plate 400 mm × 400 mm × 20 mm mounted on a bench
Tool bit	Polishing pad
Feed force	Vertical force applied in addition to the weight of the tool: – 30 N ± 5 N, if the mass of the tool is less than 1,5 kg; – 50 N ± 5 N, if the mass of the tool is equal or greater than 1,5 kg; – or the force necessary to obtain rated input, whichever is the lower. For **battery**-powered **polishers**, the mass of the tool to select the feed force shall be the mass of the tool but not including any **detachable battery pack(s)** or **separable battery pack(s)**.

I.3.6.2 Declaration of the vibration total value

Addition:

The vibration total value a_h of the handle with the highest emission and the uncertainty K shall be declared.

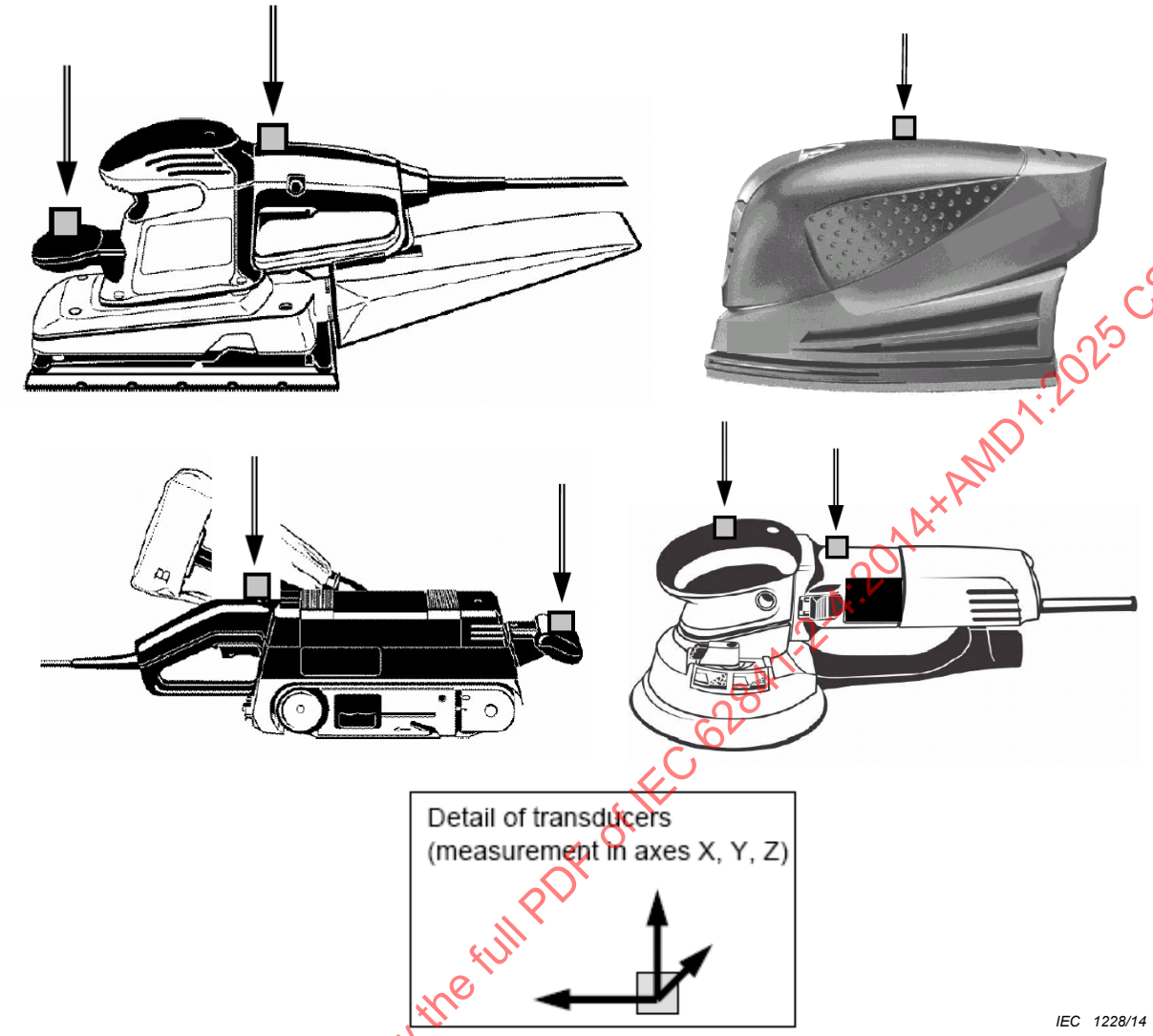


Figure I.101 – Position of transducers for sanders and polishers

Annex K
(normative)

Battery tools and battery packs

K.1 *Addition:*

All clauses of this Part 2-4 apply unless otherwise specified in this annex.

K.8.14.1.101 This subclause is not applicable.

K.17.2 This subclause is not applicable.

K.20.5 This subclause is not applicable.

K.21.30 This subclause is not applicable.

Bibliography

The bibliography of Part 1 is applicable, except as follows:

Addition:

IEC 62841-2-3:–, *Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety – Part 2-3: Particular requirements for hand-held grinders, polishers and disc-type sanders*[1]

[1] To be published.

CONTENTS

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drum sander or polisher
sander or **polisher** equipped with a rotating cylindrical working surface, oriented either inline or at an angle with the motor axis

Note 1 to entry: **Drum polishers** are also known as burnishing machines.

Note 2 to entry: **Drum sanders** with a drum in line with the axis of the motor are also known as spindle sanders or inline sanders.

3.105
orbital sander or polisher
sander or **polisher** equipped with a plate, which performs an orbital oscillating motion parallel to the work surface

Note 1 to entry: Orbital sanders or polishers are also known as oscillating sanders or polishers

3.106
random orbit sander or polisher
sander or **polisher** equipped with a plate positioned eccentrically on the driving spindle which can rotate freely around its axis parallel to the work surface

3.107
reciprocating sander or polisher
sander or **polisher** equipped with a plate which performs a reciprocating motion parallel to the work surface

4 General requirements

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable, except as follows:

5.17 *Addition:*

The mass of the tool includes the dust extraction adapter, if any.

6 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

7 Classification

This clause of Part 1 is applicable.

8 Marking and instructions

This clause of Part 1 is applicable, except as follows:

8.3 *Addition:*

For **belt sanders** and **drum sanders** and **polishers**, the direction of rotation shall be indicated on the tool by an arrow, raised or sunk, or by any other means no less visible and indelible.

8.14.1 *Addition:*

For **belt sanders and drum sanders**, the additional safety instructions as specified in 8.14.1.101 shall be given. This part may be printed separately from the “General Power Tool Safety Warnings”.

8.14.1.101 Belt sander and drum sander safety warnings

Hold the power tool by insulated gripping surfaces, because the sanding surface may contact its own cord. *Cutting a "live" wire may make exposed metal parts of the power tool "live" and could give the operator an electric shock.*

9 Protection against access to live parts

This clause of Part 1 is applicable.

10 Starting

This clause of Part 1 is applicable.

11 Input and current

This clause of Part 1 is applicable.

12 Heating

This clause of Part 1 is applicable.

13 Resistance to heat and fire

This clause of Part 1 is applicable.

14 Moisture resistance

This clause of Part 1 is applicable.

15 Resistance to rusting

This clause of Part 1 is applicable.

16 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

17 Endurance

This clause of Part 1 is applicable, except as follows:

17.2 *Replacement of the third paragraph, except for* ***belt sanders*** *and* ***drum sanders*** *and* ***polishers****:*

Orbital sanders *and* ***polishers****,* ***random orbit sanders*** *and* ***polishers****, and* ***reciprocating sanders*** *and* ***polishers*** *are operated for 24 h at a voltage equal to 1,1 times the highest rated voltage or 1,1 times the upper limit of the rated voltage range, and then for 24 h at a supply voltage equal to 0,9 times the lowest rated voltage or 0,9 times the lower limit of the rated voltage range. The 24 h of operation need not be continuous. If applicable, the tool is adjusted to the maximum attainable speed.*

The tools are operated while the platen, fitted with abrasive paper in reverse position or a polishing bonnet as applicable, is resting under the weight of the tool on a steel plate. The abrasive paper should be replaced as required to avoid direct contact between platen and steel plate. These tools are only tested in the upright position where the platen is horizontal.

18 Abnormal operation

This clause of Part 1 is applicable, except as follows:

18.8 *Replacement of Table 4:*

Table 4 – Required performance levels

Type and purpose of SCF	Minimum performance level (PL)
Power switch – prevent unwanted switch-on for **belt sanders**, **drum sanders** and **drum polishers**	b
Power switch – prevent unwanted switch-on for **sanders** and **polishers** other than **belt sanders**, **drum sanders**, **drum polishers**	Not an **SCF**
Power switch – provide desired switch-off for **belt sanders**, **drum sanders** and **drum polishers**	b
Power switch – provide desired switch-off for **sanders** and **polishers** other than **belt sanders**, **drum sanders** and **drum polishers**	Not an **SCF**
Provide desired direction of rotation for **belt sanders**, **drum sanders** and **drum polishers**	a
Any speed limiting device	Not an **SCF**
Prevent exceeding thermal limits as in 18.4 and 18.5.3	a

19 Mechanical hazards

This clause of Part 1 is applicable, except as follows:

19.1 *Replacement of the first paragraph:*

Moving and dangerous parts other than the abrasive belt and belt rollers of **belt sanders** shall, as far as is compatible with the use and working of the tool, be so positioned or enclosed to provide adequate protection against personal injury. The requirements for the abrasive belt and belt rollers of **belt sanders** are specified in 19.1.101, 19.1.102 and 19.1.103.

19.1.101 **Belt sanders** shall be designed to minimise the risk due to the nip hazard from the roller closest to the operator without limiting the intended functionality of the tool.

Compliance is checked by the following tests 1 and 2.

1) *An test rod with 8 mm diameter, applied parallel to the axis of the roller, shall not be able to enter the in-feed nip between the roller and the abrasive belt. As the rod is attempted to be inserted into this area, the abrasive belt shall not be displaced in any way that would allow the entry of the rod. See Figure 101.*
2) *The abrasive belt is removed. A steel ball with 7 mm diameter is placed all along the in-feed gap between the intended belt contact surface of the roller and the belt housing enclosure with the tool turned upside down in the most unfavourable position, see Figure 102. The steel ball shall not move under its own weight into the gap between the roller and the belt housing beyond the line of complete passage as shown in Figure 102.*

19.1.102 **Belt sanders** shall be designed to limit access to in-feed nip locations from roller(s) other than those closest to the operator without limiting the intended functionality of the tool.

In-feed nip locations are regarded to be located either

between the intended belt contact surface of the roller and the belt housing enclosure

or

between the intended belt contact surface of the roller and the abrasive belt.

Access shall be limited by either a) or b) as follows:

a) The chain distance between any in-feed nip location and the closest point on a handle or grasping surface identified in accordance with 8.14.2 b) 6) shall be at least 100 mm.

Compliance is checked by measurement.

b) If a stick-type auxiliary handle is mounted to the side with its axis perpendicular to the direction of movement of the abrasive belt, it shall be provided with a flange having a height not less than 12 mm above the grasping surface between the grasping area and the in-feed nip location.

Compliance is checked by inspection and by measurement.

19.1.103 The ends of rollers that extend past the edge of the intended belt contact surface shall be smooth and free of sharp edges.

Compliance is checked by inspection.

19.6 This subclause is not applicable.

20 Mechanical strength

This clause of Part 1 is applicable, except as follows:

20.5 This subclause is not applicable for **sanders** and **polishers** except for **belt sanders** and **drum sanders**.

21 Construction

This clause of Part 1 is applicable, except as follows:

21.18.1 *Addition:*

For

– **sanders** other than **belt sanders** and **drum sanders**; and
– **polishers** other than **drum polishers**,

power switches other than **momentary power switches** are permitted.

21.18.1.2 This subclause of Part 1 is not applicable.

Replace the existing text of the third dashed item of 21.35 with the following new text:

– other **sanders**, with a sanding contact surface exceeding 200 cm^2,

unless the tool is intended to process only metal in accordance with 8.14.2 b) 4) of Part 1.

21.30 This subclause is not applicable for **sanders** and **polishers** except for **belt sanders** and **drum sanders**.

21.35 This subclause is applicable for:

– **belt sanders** and **random orbit sanders** with a sanding contact surface exceeding 100 cm^2;
– **drum sanders** other than spindle sanders;
– other **sanders**, with a sanding contact surface exceeding 200 cm^2, unless they are intended to process only metal in accordance with 8.14.2 b) 4).

22 Internal wiring

This clause of Part 1 is applicable.

23 Components

This clause of Part 1 is applicable, except as follows:

23.3 This subclause of Part 1 is not applicable.

24 Supply connection and external flexible cords

This clause of Part 1 is applicable.

25 Terminals for external conductors

This clause of Part 1 is applicable.

26 Provision for earthing

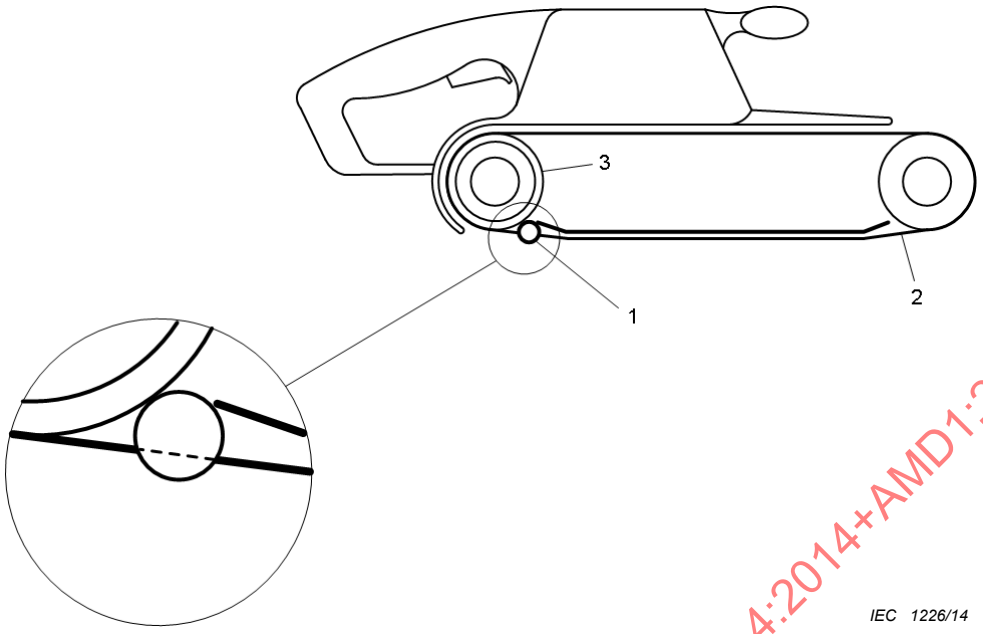
This clause of Part 1 is applicable.

27 Screws and connections

This clause of Part 1 is applicable.

28 Creepage distances, clearances and distances through insulation

This clause of Part 1 is applicable.



Key

1 rod with 8 mm diameter

2 abrasive belt

3 roller closest to the operator

Figure 101 – Rod test for the in-feed nip between the belt and roller