IEC 62841-2-3

Edition 1.1 2024-10
CONSOLIDATED VERSION

INTERNATIONAL STANDARD

colour inside

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.140.20

ISBN 978-2-8322-9934-0

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

CONTENTS

FOREWORD 5
1 Scope 7
2 Normative references 7
3 Terms and definitions 8
4 General requirements 11
5 General conditions for the tests 11
6 Radiation, toxicity and similar hazards 12
7 Classification 12
8 Marking and instructions 12
9 Protection against access to live parts 24
10 Starting 24
11 Input and current 24
12 Heating 24
13 Resistance to heat and fire 24
14 Moisture resistance 24
15 Resistance to rusting 25
16 Overload protection of transformers and associated circuits 25
17 Endurance 25
18 Abnormal operation 25
19 Mechanical hazards 25
20 Mechanical strength 33
21 Construction 44
22 Internal wiring 48
23 Components 48
24 Supply connection and external flexible cords 48
25 Terminals for external conductors 48
26 Provision for earthing 49
27 Screws and connections 49
28 Creepage distances, clearances and distances through insulation 49
Annexes 50
Annex I (informative) Measurement of noise and vibration emissions 50
Annex K (normative) Battery tools and battery packs 60
Annex L (normative) Battery tools and battery packs provided with mains connection or non-isolated sources 63
Annex AA (normative) Wheel guard types 64
Annex BB (informative) Material and thickness of wheel guards 73
Annex CC (normative) Wheel type specifications 74
Bibliography 80

Figure 101 – Example of an angle grinder 9
Figure 102 – Example of a straight grinder 10
Figure 103 – Example of a vertical grinder 10

Figure 116 – Example of a concrete surface grinder 11
Figure 104 – ~~Examples of gaps and rake angles~~ Examples of segmented diamond cutting wheel constructions 23
Figure 105 – Principal dimensions of flanges for wheels other than Type 4 30
Figure 106 – Principal dimensions of flanges for wheels type 4 30
Figure Z101 – Depressed centre of abrasive wheels 31
Figure 107 – Wheel guard strength test: explanation of wheel guard positions 36
Figure 108 – Wheel guard strength test: preparation of the grinder 37
Figure 109 – Wheel guard strength test: preparation of cup wheel types 6 and 11 38
Figure 110 – Wheel guard strength test: angle grinders and vertical grinders without side handles 39
Figure 111 – Wheel guard strength test box 40
Figure 112 – Wheel guard strength test: straight grinder with additional masses 44
Figure 113 – Measurement of handle gripping length 46
Figure 114 – Measurement of handle gripping length 47
Figure 115 – Measurement of handle gripping length for a handle with finger grips or similar superimposed profiles 47
Figure I.101 – Positions of transducers for straight grinders 51
Figure I.102 – Positions of transducers for angle grinders 51
Figure I.103 – Positions of transducers for disc-type polishers and disc-type sanders 51
Figure I.104 – Artificial grinding wheel for angle grinding and concrete grinding 54
Figure I.105 – Working positions of operator and application of force 55
Figure I.106 – Artificial grinding wheel for straight grinding 57
Figure AA.1 – Design example for wheel guard of Type A (cut-off wheel guard) 64
Figure AA.2 – Wheel guard of Type B (grinding wheel guard) 66
Figure AA.3 – Wheel guard of Type C (combination wheel guard) 67
Figure AA.4 – Adjustable wheel guard of Type D (cup wheel guard) 68
Figure AA.5 – Wheel guard of Type E (diamond grinding wheel guard) 69
Figure AA.6 – Wheel guard of Type F (masonry cut-off wheel guard) 70
Figure AA.7 – Wheel guard of Type G (straight grinder wheel guard) 72
Figure CC.1 – Wheel type 1 74
Figure CC.2 – Wheel type 4 75
Figure CC.3 – Wheel type 6 75
Figure CC.4 – Wheel type 11 76
Figure CC.5 – Wheel type 27 77
Figure CC.6 – Wheel type 28 77
Figure CC.7 – Wheel type 29 78
Figure CC.8 – Wheel type 41 78
Figure CC.9 – Wheel type 42 79

Table 4 – Required performance levels 25
Table 101 – Accessories and guards for various applications 28
Table Z101 – Dimensions of depressed centre wheels 31
Table 102 – Minimum flange dimensions for wheel type 4 32

Table 103 – Torques for testing flanges 33
Table 104 – Typical pre-cut length ranges for standard wheel dimensions 38
Table 105 – Guard thickness for diamond cutting wheels 41
Table 106 –Typical pre-cut length ranges for standard wheel dimensions 43
Table I.101 – Test conditions for angle grinding and concrete grinding 52
Table I.102 – Dimensions of the artificial wheel of Figure I.104 or Figure I.106 for angle grinding, cutting off and concrete grinding 56
Table I.103 – Feed force 56
Table I.104 – Test conditions for straight grinding 56
Table I.105 – Dimensions of the artificial wheel of Figure I.106 for straight grinding 57
Table I.106 – Test conditions for polishing 58
Table I.107 – Test conditions for disc-type sanding 58
Table 4 – Required performance levels 60
Table BB.101 – Wheel guard thickness 73

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

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

Part 2-3: Particular requirements for hand-held grinders, disc-type polishers and disc-type sanders

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 62841-2-3 edition 1.1 contains the first edition (2020-04) [documents 116/444/FDIS and 116/454/RVD], its corrigendum 1 (2021-04) and its amendment 1 (2024-10) [documents 116/813/FDIS and 116/832/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 62841-2-3 has been prepared by IEC technical committee 116: Safety of motor-operated electric tools.

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

This Part 2-3 is to be used in conjunction with the first edition of IEC 62841-1:2014.

This Part 2-3 supplements or modifies the corresponding clauses in IEC 62841-1, so as to convert it into the IEC Standard: Particular requirements for hand-held grinders, disc-type polishers and disc-type sanders.

Where a particular subclause of Part 1 is not mentioned in this Part 2-3, that subclause applies as far as relevant. 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 in **bold typeface** in the text are defined in Clause 3

Subclauses, notes and figures which are additional to those in Part 1 are numbered starting from 101.

A list of all parts of the IEC 62841 series, under the general title: *Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety*, can be found on the IEC website.

The committee has decided that the contents of this document and its amendment 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.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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

Part 2-3: Particular requirements for hand-held grinders, disc-type polishers and disc-type sanders

1 Scope

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

Addition:

This ~~part of IEC 62841~~ document applies to hand-held **grinders**, **disc-type polishers** and **disc-type sanders**, including angle, straight and vertical tools, intended for use on various materials except magnesium, with a **rated capacity** not exceeding 230 mm. For **grinders**, the **rated no-load speed** does not exceed a peripheral speed of the **accessory** of 80 m/s at **rated capacity**.

This document also applies to **concrete surface grinders** for use on various masonry materials with a **rated capacity** not exceeding 230 mm.

This document does not apply to **grinders** intended to be fitted with an **accessory** other than a bonded abrasive product or a **diamond wheel**.

This document does not apply to **grinders** intended to be fitted with **diamond wheels** with

– peripheral gaps exceeding 10 mm; or
– a positive rake angle.

This ~~standard~~ document does not apply to dedicated cut-off machines.

NOTE 101 It is planned that a document on cut-off machines will be published.

This ~~standard~~ document does not apply to orbital polishers and orbital sanders.

NOTE 102 ~~It is planned that a document on orbital polishers and orbital sanders will be published.~~ Orbital polishers and orbital sanders are covered by IEC 62841-2-4.

This ~~standard~~ document does not apply to die grinders.

NOTE 103 ~~Die grinders are covered by IEC 62841-2-23.~~ It is planned that a document on die grinders will be published.

2 Normative references

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

Addition:

ISO 525:~~2013~~2020, *Bonded abrasive products – ~~General requirements~~ Shape types, designation and marking*

CONTENTS

FOREWORD 5
1 Scope 7
2 Normative references 7
3 Terms and definitions 7
4 General requirements 11
5 General conditions for the tests 11
6 Radiation, toxicity and similar hazards 11
7 Classification 11
8 Marking and instructions 11
9 Protection against access to live parts 20
10 Starting 20
11 Input and current 20
12 Heating 20
13 Resistance to heat and fire 20
14 Moisture resistance 20
15 Resistance to rusting 21
16 Overload protection of transformers and associated circuits 21
17 Endurance 21
18 Abnormal operation 21
19 Mechanical hazards 21
20 Mechanical strength 29
21 Construction 40
22 Internal wiring 44
23 Components 44
24 Supply connection and external flexible cords 44
25 Terminals for external conductors 44
26 Provision for earthing 45
27 Screws and connections 45
28 Creepage distances, clearances and distances through insulation 45
Annexes 46
Annex I (informative) Measurement of noise and vibration emissions 46
Annex K (normative) Battery tools and battery packs 55
Annex L (normative) Battery tools and battery packs provided with mains connection or non-isolated sources 58
Annex AA (normative) Wheel guard types 59
Annex BB (informative) Material and thickness of wheel guards 66
Annex CC (normative) Wheel type specifications 67
Bibliography 73

Figure 101 – Example of an angle grinder 9
Figure 102 – Example of a straight grinder 9
Figure 103 – Example of a vertical grinder 10

Figure 116 – Example of a concrete surface grinder 10
Figure 104 – Examples of segmented diamond cutting wheel constructions 19
Figure 105 – Principal dimensions of flanges for wheels other than Type 4 26
Figure 106 – Principal dimensions of flanges for wheels type 4 26
Figure Z101 – Depressed centre of abrasive wheels 27
Figure 107 – Wheel guard strength test: explanation of wheel guard positions 32
Figure 108 – Wheel guard strength test: preparation of the grinder 33
Figure 109 – Wheel guard strength test: preparation of cup wheel types 6 and 11 34
Figure 110 – Wheel guard strength test: angle grinders and vertical grinders without side handles 35
Figure 111 – Wheel guard strength test box 36
Figure 112 – Wheel guard strength test: straight grinder with additional masses 40
Figure 113 – Measurement of handle gripping length 42
Figure 114 – Measurement of handle gripping length 43
Figure 115 – Measurement of handle gripping length for a handle with finger grips or similar superimposed profiles 43
Figure I.101 – Positions of transducers for straight grinders 47
Figure I.102 – Positions of transducers for angle grinders 47
Figure I.103 – Positions of transducers for disc-type polishers and disc-type sanders 47
Figure I.104 – Artificial grinding wheel for angle grinding and concrete grinding 49
Figure I.105 – Working positions of operator and application of force 50
Figure I.106 – Artificial grinding wheel for straight grinding 52
Figure AA.1 – Design example for wheel guard of Type A (cut-off wheel guard) 59
Figure AA.2 – Wheel guard of Type B (grinding wheel guard) 60
Figure AA.3 – Wheel guard of Type C (combination wheel guard) 61
Figure AA.4 – Adjustable wheel guard of Type D (cup wheel guard) 62
Figure AA.5 – Wheel guard of Type E (diamond grinding wheel guard) 63
Figure AA.6 – Wheel guard of Type F (masonry cut-off wheel guard) 64
Figure AA.7 – Wheel guard of Type G (straight grinder wheel guard) 65
Figure CC.1 – Wheel type 1 67
Figure CC.2 – Wheel type 4 68
Figure CC.3 – Wheel type 6 68
Figure CC.4 – Wheel type 11 69
Figure CC.5 – Wheel type 27 70
Figure CC.6 – Wheel type 28 70
Figure CC.7 – Wheel type 29 71
Figure CC.8 – Wheel type 41 71
Figure CC.9 – Wheel type 42 72

Table 4 – Required performance levels 21
Table 101 – Accessories and guards for various applications 24
Table Z101 – Dimensions of depressed centre wheels 27
Table 102 – Minimum flange dimensions for wheel type 4 28
Table 103 – Torques for testing flanges 28

Table 104 – Typical pre-cut length ranges for standard wheel dimensions 34
Table 105 – Guard thickness for diamond cutting wheels 37
Table 106 –Typical pre-cut length ranges for standard wheel dimensions 39
Table I.101 – Test conditions for angle grinding and concrete grinding 48
Table I.102 – Dimensions of the artificial wheel of Figure I.104 or Figure I.106 for angle grinding, cutting off and concrete grinding 51
Table I.103 – Feed force 51
Table I.104 – Test conditions for straight grinding 51
Table I.105 – Dimensions of the artificial wheel of Figure I.106 for straight grinding 52
Table I.106 – Test conditions for polishing 53
Table I.107 – Test conditions for disc-type sanding 53
Table 4 – Required performance levels 55
Table BB.101 – Wheel guard thickness 66

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

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

Part 2-3: Particular requirements for hand-held grinders, disc-type polishers and disc-type sanders

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 62841-2-3 edition 1.1 contains the first edition (2020-04) [documents 116/444/FDIS and 116/454/RVD], its corrigendum 1 (2021-04) and its amendment 1 (2024-10) [documents 116/813/FDIS and 116/832/RVD].

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 62841-2-3 has been prepared by IEC technical committee 116: Safety of motor-operated electric tools.

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

This Part 2-3 is to be used in conjunction with the first edition of IEC 62841-1:2014.

This Part 2-3 supplements or modifies the corresponding clauses in IEC 62841-1, so as to convert it into the IEC Standard: Particular requirements for hand-held grinders, disc-type polishers and disc-type sanders.

Where a particular subclause of Part 1 is not mentioned in this Part 2-3, that subclause applies as far as relevant. 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 in **bold typeface** in the text are defined in Clause 3

Subclauses, notes and figures which are additional to those in Part 1 are numbered starting from 101.

A list of all parts of the IEC 62841 series, under the general title: *Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety*, can be found on the IEC website.

The committee has decided that the contents of this document and its amendment 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 HAND-HELD TOOLS, TRANSPORTABLE TOOLS AND LAWN AND GARDEN MACHINERY – SAFETY –

Part 2-3: Particular requirements for hand-held grinders, disc-type polishers and disc-type sanders

1 Scope

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

Addition:

This document applies to hand-held **grinders**, **disc-type polishers** and **disc-type sanders**, including angle, straight and vertical tools, intended for use on various materials except magnesium, with a **rated capacity** not exceeding 230 mm. For **grinders**, the **rated no-load speed** does not exceed a peripheral speed of the **accessory** of 80 m/s at **rated capacity**.

This document also applies to **concrete surface grinders** for use on various masonry materials with a **rated capacity** not exceeding 230 mm.

This document does not apply to **grinders** intended to be fitted with an **accessory** other than a bonded abrasive product or a **diamond wheel**.

This document does not apply to **grinders** intended to be fitted with **diamond wheels** with

– peripheral gaps exceeding 10 mm; or
– a positive rake angle.

This document does not apply to dedicated cut-off machines.

NOTE 101 It is planned that a document on cut-off machines will be published.

This document does not apply to orbital polishers and orbital sanders.

NOTE 102 Orbital polishers and orbital sanders are covered by IEC 62841-2-4.

This document does not apply to die grinders.

NOTE 103 It is planned that a document on die grinders will be published.

2 Normative references

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

Addition:

ISO 525:2020, *Bonded abrasive products – Shape types, designation and marking*