

# Hand-held motor-operated electric tools — Safety —

## Part 2-3: Particular requirements for grinders, polishers and disk-type sanders

ICS 25.080.50; 25.140.20

## National foreword

This British Standard is the UK implementation of EN 60745-2-3:2011+A13:2015. It is derived from IEC 60745-2-3:2006, incorporating amendments 1:2010 and 2:2012, and corrigendum February 2011. It supersedes BS EN 60745-2-3:2011+A12:2014, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by **A1** **A1**.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by IEC corrigendum February 2011 is indicated in the text by **AC1** **AC1**.

The CENELEC common modifications have been implemented at the appropriate places in the text and are indicated by tags (e.g. **C** **C**).

Where a common modification to an IEC amendment has been introduced, the tags carry the number of the amendment. For example, the common modifications introduced by CENELEC to IEC amendment 2 are indicated by **C2** **C2**.

The UK participation in its preparation was entrusted by Technical Committee CPL/116, Safety of motor-operated electric tools.

A list of organizations represented on this committee can be obtained on request to its secretary.

BSI, as a member of CENELEC, is obliged to publish EN 60745-2-3 as a British Standard. However, the UK committee does not support the use of lock-on switches for grinders above 155 mm.

The publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a British Standard cannot confer immunity from legal obligations.**

### Amendments/corrigenda issued since publication

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| Date             | Comments                                                                                   |
|------------------|--------------------------------------------------------------------------------------------|
| 30 June 2013     | Implementation of IEC amendment 2:2012 with CENELEC endorsement A2:2013: Z Annexes updated |
| 31 August 2014   | Implementation of CENELEC amendment A11:2014: Subclause 21.18.1 updated                    |
| 31 January 2015  | Implementation of CENELEC amendment A12:2014: subclause 19.104 replaced                    |
| 31 December 2015 | Implementation of CENELEC amendment A13:2015: Subclause 19.104 replaced, Figure Z107 added |
| 30 April 2016    | Correction made to contents page                                                           |

**Hand-held motor-operated electric tools -  
Safety -  
Part 2-3: Particular requirements for grinders,  
polishers and disk-type sanders**  
(IEC 60745-2-3:2006, modified + A1:2010, modified  
+ A1:2010/corrigendum Feb. 2011)

Outils électroportatifs à moteur -  
Sécurité -  
Partie 2-3: Règles particulières pour les  
meuleuses, lustreuses et ponceuses du  
type à disque  
(CEI 60745-2-3:2006, modifiée  
+ A1:2010, modifiée  
+ A1:2010/corrigendum Feb. 2011)

Handgeführte motorbetriebene  
Elektrowerkzeuge -  
Sicherheit -  
Teil 2-3: Besondere Anforderungen für  
Schleifer, Polierer und Schleifer mit  
Schleifblatt  
(IEC 60745-2-3:2006, modifiziert  
+ A1:2010, modifiziert  
+ A1:2010/corrigendum Feb. 2011)

This European Standard was approved by CENELEC on 2011-02-01. CENELEC 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of the International Standard IEC 60745-2-3:2006 + A1:2010, prepared by IEC TC 116, Safety of hand-held motor-operated electric tools, together with the common modifications prepared by the Technical Committee CENELEC TC 116, Safety of hand-held motor-operated electric tools, was submitted to the formal vote and was approved as EN 60745-2-3:2011 on 2011-02-01.

This European Standard supersedes EN 60745-2-3:2007 + A11:2009.

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

The following dates were fixed:

- latest date by which the amendment has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 2012-02-01
- latest date by which the national standards conflicting  
with the amendment have to be withdrawn (dow) 2014-02-01

This European Standard is divided into two parts:

- Part 1: General requirements which are common to most hand-held electric motor operated tools (for the purpose of this standard referred to simply as tools) which could come within the scope of this standard;
- Part 2: Requirements for particular types of tools which either supplement or modify the requirements given in Part 1 to account for the particular hazards and characteristics of these specific tools.

This European Standard has been prepared under Mandate 396 given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 2006/42/EC. See Annex ZZ.

Compliance with the clauses of Part 1 together with this Part 2-3 provides one means of conforming with the essential health and safety requirements of the Directive concerned.

**Warning:** Other requirements and other EC Directives can be applicable to the products falling within the scope of this standard.

CEN/TC 255 is producing standards for non-electric grinders (EN 792-7), polishers and sanders (EN 792-8) and die grinders (EN 792-9).

This European Standard follows the overall requirements of EN ISO 12100-1 and EN ISO 12100-2.

This Part 2-3 is to be used in conjunction with EN 60745-1:2009. When this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

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

Subclauses, tables and figures which are additional to those in IEC 60745-2-3:2006 + A1:2010 are prefixed "Z".

Annexes ZA and ZZ have been added by CENELEC.

NOTE In this standard the following print types are used:

- requirements proper; in roman type;
- *test specifications: in italic type;*
- explanatory matter: in smaller roman type.

### Endorsement notice

The text of the International Standard IEC 60745-2-3:2006 + A1:2010 was approved by CENELEC as a European Standard with agreed common modifications.

### Foreword to amendment A2

This document (EN 60745-2-3:2011/A2:2013) consists of the text of IEC 60745-2-3:2006/A2:2012 prepared by IEC/TC 116 "Safety of motor-operated electric tools", together with the common modifications 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 (dop) 2014-02-25  
at national level by publication of an identical  
national standard or by endorsement
- latest date by which the national standards conflicting (dow) 2016-02-25  
with this document have to be withdrawn

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### Endorsement notice

The text of the International Standard IEC 60745-2-3:2006/A2:2012 was approved by CENELEC as a European Standard with agreed common modifications.

### Foreword to amendment A11

This document (EN 60745-2-3:2011/A11:2014) has been prepared by CLC/TC116 "Safety of motor-operated electric tools".

The following dates are fixed:

- latest date by which this document has to be (dop) 2015-04-21  
implemented at national level by  
publication of an identical national  
standard or by endorsement
- latest date by which the national standards (dow) 2016-04-21  
conflicting with this  
document have to be withdrawn

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For the relationship with EU Directive see informative Annex ZZ, included in EN 60745-2-3:2011.

## **Foreword to amendment A12**

This document (EN 60745-2-3:2011/A12:2014) has been prepared by CLC/TC 116 "Safety of motor-operated electric tools".

This amendment was developed to modify requirements for the size of flanges for depressed centre grinding wheels.

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) 2015-11-17
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2017-11-17

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For the relationship with EU Directive(s) see informative Annex ZZ, which is included in EN 60745-2-3:2011.

## **Foreword to amendment A13**

This document (EN 60745-2-3:2011/A13:2015) has been prepared by CLC/TC 116 "Safety of motor-operated electric tools".

This amendment was developed to specify the dimensions for the size of flanges for depressed centre grinding wheels, as these dimensions are not clearly detailed in ISO 603-14 and ISO 603-16.

The following dates are fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-09-28
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2018-09-28

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For the relationship with EU Directive, see informative Annex ZZ, which is included in EN 60745-2-3:2011.

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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

NOTE Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

| <u>Publication</u> | <u>Year</u> | <u>Title</u>                                                                                                                 | <u>EN/HD</u>   | <u>Year</u> |
|--------------------|-------------|------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|
| IEC 62061          | 2005        | Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems | EN 62061       | 2005        |
| ISO 603-12         | 1999        | Bonded abrasive products – Dimensions – Part 12: Grinding wheels for deburring and fettling on a straight grinder            | -              | -           |
| ISO 603-14         | 1999        | Bonded abrasive products – Dimensions – Part 14: Grinding wheels for deburring and fettling/snagging on an angle grinder     | -              | -           |
| ISO 603-16         | 1999        | Bonded abrasive products – Dimensions – Part 16: Grinding wheels for cutting-off on hand held power tools                    | -              | -           |
| ISO 13849-1        | 2006        | Safety of machinery – Safety related parts of control systems – Part 1: General principles for design                        | EN ISO 13849-1 | 2008        |
| ANSI B74.2         | 2003        | Specifications for Shapes and Sizes of Grinding Wheels, and for Shapes, Sizes and Identification of Mounted Wheels           | -              | -           |

**Annex ZZ**  
(informative)

**Coverage of Essential Requirements of Directive 2006/42/EC**

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant Essential Requirements as given in EC Directive 2006/42/EC (Machinery Directive).

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directives concerned.

WARNING: Other requirements and other EC Directives may be applicable to the products falling within the scope of this standard.

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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### HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – SAFETY –

#### Part 2-3: Particular requirements for grinders, polishers and disk-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.
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**This consolidated version of IEC 60745-2-3 consists of the second edition (2006) [documents 61F/624/FDIS and 61F/634/RVD] and its amendment 1 (2010) [documents 116/53/FDIS and 116/56/RVD]. It bears the edition number 2.1.**

**The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.**

International Standard IEC 60745-2-3 has been prepared by subcommittee 61F: Safety of hand-held motor-operated electric tools, of IEC technical committee 61: Safety of household and similar electrical appliances.

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

This part 2 is to be used in conjunction with the latest edition of IEC 60745-1, *Hand-held motor-operated electric tools – Safety – Part 1: General requirements*, and its amendments. It was established on the basis of the third edition (2001) of that standard.

NOTE 1 When “Part 1” is mentioned in this standard, it refers to IEC 60745-1.

This part 2 supplements or modifies the corresponding clauses of IEC 60745-1, so as to convert that publication into the IEC standard: Safety for grinders, polishers and disk-type sanders.

When a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states “addition”, “modification” or “replacement”, the relevant text in Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- additional annexes are lettered AA, BB, etc.

NOTE 3 In this standard, the following print types are used:

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

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

IEC 60745 consists of the following parts, under the general title *Hand-held motor-operated electric tools – Safety*:

- Part 1: General requirements
- Part 2-1: Particular requirements for drills and impact drills
- Part 2-2: Particular requirements for screwdrivers and impact wrenches
- Part 2-3: Particular requirements for grinders, polishers and disk-type sanders
- Part 2-4: Particular requirements for sanders and polishers other than disk type
- Part 2-5: Particular requirements for circular saws and circular knives
- Part 2-6: Particular requirements for hammers
- Part 2-7: Particular requirements for spray guns for non-flammable liquids
- Part 2-8: Particular requirements for shears and nibblers
- Part 2-9: Particular requirements for tappers
- Part 2-11: Particular requirements for reciprocating saws (jig and sabre saws)
- Part 2-12: Particular requirements for concrete vibrators
- Part 2-13: Particular requirements for chain saws
- Part 2-14: Particular requirements for planers
- Part 2-15: Particular requirements for hedge trimmers and grass shears
- Part 2-16: Particular requirements for tackers
- Part 2-17: Particular requirements for routers and trimmers
- Part 2-18: Particular requirements for strapping tools

- Part 2-19: Particular requirements for jointers
- Part 2-20: Particular requirements for band saws
- Part 2-21: Particular requirements for drain cleaners

The amendment modifies the present part 2-3 to ensure its conformity with the fourth edition (2006) of IEC 60745-1, *Hand-held motor-operated electric tools – Safety – Part 1: General requirements*.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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

## HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – SAFETY –

### Part 2-3: Particular requirements for grinders, polishers and disk-type sanders

#### 1 Scope

**A1** This clause of Part 1 is applicable, except as follows:

*Addition:*

This standard applies to grinders, polishers and disk-type sanders, including angle, straight and vertical tools, with a rated capacity not exceeding 230 mm. For grinders, the rated speed does not exceed a peripheral speed of the accessory of 80 m/s at rated capacity.

This standard does not apply to dedicated cut-off machines which are covered by IEC 60745-2-22.

This standard does not apply to random-orbit polishers and random-orbit sanders which are covered by IEC 60745-2-4. **A1**

**A2** This standard does not apply to die grinders utilizing collets or chucks for mounting threaded cones and mandrel mounted wheels which are covered by IEC 60745-2-23. **A2**

#### 2 Normative references

This clause of Part 1 is applicable except as follows:

*Addition:*

ISO 603-12:1999, *Bonded abrasive products – Dimensions – Part 12: Grinding wheels for deburring and fettling on a straight grinder*

ISO 603-14:1999, *Bonded abrasive products – Dimensions – Part 14: Grinding wheels for deburring and fettling/snagging on an angle grinder*

ISO 603-16:1999, *Bonded abrasive products – Dimensions – Part 16: Grinding wheels for cutting-off on hand held power tools*

**A2** Text deleted **A2**

**A2** ANSI B74.2:2003, *Specifications for Shapes and Sizes of Grinding Wheels, and for Shapes, Sizes and Identification of Mounted Wheels* **A2**

**C** EN 62061:2005, *Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems* (IEC 62061:2005)

EN ISO 13849-1:2008, *Safety of machinery – Safety related parts of control systems – Part 1: General principles for design* (ISO 13849-1:2006) **C**

### **3 Terms and definitions**

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

#### **3.101**

##### **blotter**

thin piece of an easily compressible material, between the abrasive product and flange

#### **3.102**

##### **disk-type sander**

tool, constructed like a grinder, intended for sanding

##### **3.102.1**

##### **angle disk-type sander**

tool with the rotating spindle at a right angle to the motor shaft, intended for lateral sanding

##### **3.102.2**

##### **straight disk-type sander**

tool with the rotating spindle in-line with the motor shaft, intended for peripheral or lateral sanding

##### **3.102.3**

##### **vertical disk-type sander**

tool with the rotating spindle in-line with the motor shaft, intended for lateral sanding

#### **3.103**

##### **flange**

collar, disc or plate between or against which wheels are mounted

##### **3.103.1**

##### **unrecessed flange**

flange fixed to the machine spindle having an unrecessed flat surface against which a threaded hole abrasive product is screwed, e.g. a cup wheel, a cone or a plug

##### **3.103.2**

##### **recessed flange**

flange fixed to the machine spindle having a recessed flat surface

##### **3.103.3**

##### **flange outside diameter**

outside diameter of the contact surface of a flange

##### **3.103.4**

##### **backing flange**

contacts and provides support to the back side of the wheel and is located on the spindle between wheel and tool

##### **3.103.5**

##### **locking flange**

supports the front side of the wheel and secures and clamps the wheel to the spindle and the backing flange

#### **3.104**

##### **grinder**

tool driving a rotating spindle on which a bonded abrasive product is mounted

#### 3.104.1

##### **angle grinder**

tool with the rotating spindle at a right angle to the motor shaft, intended for peripheral and lateral grinding

#### 3.104.2

##### **straight grinder**

 tool with the rotating spindle in-line with the motor shaft, equipped with an abrasive wheel intended for peripheral grinding, but not equipped with a collet or chuck 

#### 3.104.3

##### **vertical grinder**

 tool with the rotating spindle in-line with the motor shaft, intended for peripheral and lateral grinding 

#### 3.105

##### **threaded wheels**

organic or inorganic bonded abrasives of various types provided with a threaded insert for direct mounting to the grinder spindle 

#### 3.106

##### **polisher**

tool equipped with a rotating disk or pad intended for polishing

#### 3.106.1

##### **angle polisher**

tool with the rotating spindle at a right angle to the motor shaft, intended for peripheral and lateral polishing

#### 3.106.2

##### **straight polisher**

tool with the rotating spindle in-line with the motor shaft, intended for peripheral polishing

#### 3.106.3

##### **vertical polisher**

tool with the rotating spindle in-line with the motor shaft, intended for lateral polishing

#### 3.107

##### **rated capacity**

maximum diameter of the rotating accessory to be fitted on the tool as recommended by the manufacturer's instruction

#### 3.108

##### **rated speed**

maximum attainable speed as designated by the manufacturer, with any recommended accessory installed, at rated voltage or at the upper limit of the rated voltage range 

#### 3.109

##### **wheel guard**

device which partly encloses the abrasive wheel and gives protection to the operator

#### 3.110

##### **wheel types**

 wheels for different applications in accordance with ISO 603-12, ISO 603-14, ISO 603-16 or ANSI B 74.2 

#### 3.111

##### **minor fragment**

particles less than 1/16 of the mass of the abrasive wheel

**3.Z101**

**Performance Level**

**PL**

discrete level used to specify the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions

**3.Z102**

**Safety Integrity Level**

**SIL**

discrete level (one out of possible three) for specifying the safety integrity of a safety related control function, where safety integrity level three has the highest level of safety integrity and safety integrity level one has the lowest 

## **4 General requirements**

This clause of Part 1 is applicable.

## **5 General conditions for the tests**

This clause of Part 1 is applicable.

## **6 Environmental requirements**

This clause of Part 1 is applicable except as follows:

### **6.1.2.4 Modification:**

Grinders, polishers and disk-type sanders are suspended. For angle and vertical tools, the wheel or pad shall be horizontal. For straight tools, the wheel or pad shall be vertical.

### **6.1.2.5 Modification:**

Grinders, polishers and disk-type sanders are tested at no-load.

### **6.2.4.2 Location of measurement**

*Addition:*

Figures Z104 to Z106 show the positions for different types of tools.

### **6.2.6.3 Operating conditions**

*Addition:*

The weight of the tool is considered the weight of the complete tool as prepared for the test with all equipment needed for normal use and with the artificial wheel mounted, but without the cable.

#### **6.2.6.3.101 Grinding**

Tools for grinding applications shall be tested under load by using the artificial wheel under the conditions described below in Table Z101 for angle grinding and in Table Z104 for straight grinding. 