

# INTERNATIONAL STANDARD

**IEC**  
**61029-2-10**

First edition  
1998-06

---

---

## **Safety of transportable motor-operated electric tools –**

### **Part 2-10: Particular requirements for cutting-off grinders**

*Sécurité des machines-outils électriques  
semi-fixes –*

*Partie 2-10:  
Règles particulières pour  
les tourets à couper*



Reference number  
IEC 61029-2-10: 1998

## Numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series.

## Consolidated publications

Consolidated versions of some IEC publications including amendments are available. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

## Validity of this publication

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology.

Information relating to the date of the reconfirmation of the publication is available in the IEC catalogue.

Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is to be found at the following IEC sources:

- **IEC web site\***
- **Catalogue of IEC publications**  
Published yearly with regular updates  
(On-line catalogue)\*
- **IEC Bulletin**  
Available both at the IEC web site\* and as a printed periodical

## Terminology, graphical and letter symbols

For general terminology, readers are referred to IEC 60050: *International Electrotechnical Vocabulary* (IEV).

For graphical symbols, and letter symbols and signs approved by the IEC for general use, readers are referred to publications IEC 60027: *Letter symbols to be used in electrical technology*, IEC 60417: *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets* and IEC 60617: *Graphical symbols for diagrams*.

\* See web site address on title page.

# INTERNATIONAL STANDARD

# IEC 61029-2-10

First edition  
1998-06

---

---

## Safety of transportable motor-operated electric tools –

### Part 2-10: Particular requirements for cutting-off grinders

### *Sécurité des machines-outils électriques semi-fixes –*

### *Partie 2-10: Règles particulières pour les tourets à couper*

© IEC 1998 Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission  
Telefax: +41 22 919 0300

3, rue de Varembé Geneva, Switzerland  
e-mail: [inmail@iec.ch](mailto:inmail@iec.ch) IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

PRICE CODE

Q

For price, see current catalogue

## CONTENTS

	Page
FOREWORD .....	3
Clause	
1 Scope .....	5
2 Definitions .....	5
3 General requirements .....	6
4 General notes on tests .....	6
5 Rating .....	6
6 Classification .....	6
7 Marking .....	6
8 Protection against electric shock .....	7
9 Starting .....	7
10 Input and current .....	7
11 Heating .....	7
12 Leakage current .....	7
13 Radio and television interference suppression .....	7
14 Protection against ingress of foreign bodies and moisture resistance .....	7
15 Insulation resistance and electric strength .....	7
16 Endurance .....	8
17 Abnormal operation .....	8
18 Stability and mechanical hazards .....	8
19 Mechanical strength .....	11
20 Construction .....	11
21 Internal wiring .....	12
22 Components .....	12
23 Supply connection and external flexible cables and cords .....	12
24 Terminals for external conductors .....	12
25 Provision for earthing .....	12
26 Screws and connections .....	12
27 Creepage distances, clearances and distance through insulation .....	12
28 Resistance to heat, fire and tracking .....	12
29 Resistance to rusting .....	12
30 Radiation .....	12
Figures .....	13
Annexes .....	17

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF TRANSPORTABLE MOTOR-OPERATED  
ELECTRIC TOOLS –Part 2: Particular requirements for  
cutting-off grinders

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

This part of International Standard IEC 61029 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.

The text of this standard is based on the following documents:

FDIS	Report on voting
61F/235/FDIS	61F/242/RVD

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

This part 2 is to be used in conjunction with the IEC 61029-1.

This part 2 supplements or modifies the corresponding clauses in IEC 61029-1, so as to convert it into the IEC standard: Safety requirements for cutting-off grinders.

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

NOTES

1 The following print types are used:

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

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

A bilingual version of this standard may be issued at a later date.

IECNORM.COM : Click to view the full PDF of IEC 61029-2-10:1998

## SAFETY OF TRANSPORTABLE MOTOR-OPERATED ELECTRIC TOOLS –

### Part 2: Particular requirements for cutting-off grinders

#### 1 Scope

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

##### 1.1 Addition:

This standard applies to cutting-off grinders intended mainly for cutting metal with a plain abrasive cutting-off wheel whose diameter does not exceed 406 mm and has a rated peripheral speed not exceeding 80 m/s.

#### 2 Definitions

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

##### 2.21 Replacement:

##### normal load

load obtained when the tool is operated continuously, with the torque applied to the spindle such that the input, in watts, is equal to the rated input

NOTE – The normal load is based on the rated voltage or on the upper limit of the rated voltage range.

##### Addition:

##### 2.101

##### cutting-off grinders

machine designed to cut metal by means of a plain abrasive cutting-off wheel which is fixed on the tool spindle. The tool spindle is mounted on the outer end of an arm which is pivoted at its inner end on the machine frame. The machine table has a clamping device to secure the workpiece. The table can be traversed towards the cutting-off wheel (see figure 101).

##### 2.102

##### tool spindle

spindle of the cutting-off grinder which supports and transmits the rotation of the plain abrasive cutting-off wheel

##### 2.103

##### guard

device which partially encloses the plain abrasive cutting-off wheel in order to protect the users against accidental contact with the wheel in normal use and against the ejection of fragments of the wheel in the protected area in the case of breakage of the wheel

##### 2.104

##### flange assembly

means provided to clamp the plain abrasive cutting-off wheel to the machine spindle

### **2.105**

#### **straight recessed flange**

flange with central recess suitable for a plain abrasive cutting-off wheel (see figure 106)

### **2.106**

#### **workpiece fixing device**

device intended to support or hold the piece to be worked

## **3 General requirements**

This clause of part 1 is applicable.

## **4 General notes on tests**

This clause of part 1 is applicable.

## **5 Rating**

This clause of part 1 is applicable.

## **6 Classification**

This clause of part 1 is applicable.

## **7 Marking**

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

### **7.1 Addition:**

- rated no-load speed in rev/min;
- maximum diameter  $D$  of the wheel to be used;
- indication of direction of rotation of the abrasive wheel.

### **7.6 Addition:**

The direction of rotation of the wheel shall be indicated on the tool by an arrow raised or sunk, or by other means not less visible and indelible.

### **7.13 Addition:**

The handbook or information sheet shall include all the necessary information for safe working with cutting-off grinders, such as method of operation, abrasive wheel change, maintenance, assembly, transportation, etc.

In addition, the following instructions shall be given:

- wear protective glasses;
- do not use damaged abrasive wheels;
- do not use the cutting-off grinders without guards in position;
- use only abrasive wheels recommended by the manufacturer which have marked speed equal or greater to that marked on the machine;
- read the operating instructions supplied by the wheel manufacturer.

NOTE – Sketches may be used to illustrate the modes of operation.

In addition, the following information shall be given:

- how to connect the dust collection device, if any;
- for cutting-off grinders equipped with straight-sided flanges, the recommended thickness of plain abrasive cutting-off wheels and the size of the hole in the wheel.

## **8 Protection against electric shock**

This clause of part 1 is applicable.

## **9 Starting**

This clause of part 1 is applicable.

## **10 Input and current**

This clause of part 1 is applicable.

## **11 Heating**

This clause of part 1 is applicable.

## **12 Leakage current**

This clause of part 1 is applicable.

## **13 Radio and television interference suppression**

This clause of part 1 is applicable.

## **14 Protection against ingress of foreign bodies and moisture resistance**

This clause of part 1 is applicable.

## **15 Insulation resistance and electric strength**

This clause of part 1 is applicable.

## 16 Endurance

This clause of part 1 is applicable.

## 17 Abnormal operation

This clause of part 1 is applicable.

## 18 Stability and mechanical hazards

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

### 18.1 Addition:

Cutting-off grinders shall be equipped with an adequate guarding system, which cannot be removed without the aid of a tool.

The guarding system shall comply with the requirements of 18.1.101.

NOTE – Other means of achieving the necessary degree of mechanical safety are allowed provided these are equally effective and reliable as those specified.

#### 18.1.101 Guards

Guards shall be provided as part of a cutting-off grinder.

The portion of the abrasive wheel which is not performing the cutting action shall be completely enclosed by a fixed guard.

The remaining part of the abrasive wheel shall be protected by a movable guard which covers the abrasive wheel rim on both sides and which shall return automatically to its rest position when the abrasive wheel is withdrawn from the workpiece.

The guards shall comply with the requirements outlined hereafter.

#### 18.1.102 Thickness of the guards

**Table 101 – Minimum thickness of the guard**

<i>D</i> mm	Tensile strength N/mm <sup>2</sup>			
	>200 ≤ 390		>390	
	<i>P</i> mm	<i>J</i> mm	<i>P</i> mm	<i>J</i> mm
≤250	3	1,5	1,5	1,5
250 < <i>D</i> ≤ 300	4	2	2	1,5
300 ≤ <i>D</i> < 406	4	3	2	1,5

where  
*D* is the maximum diameter of abrasive wheel;  
*P* is the thickness of the periphery of guard;  
*J* is the thickness of the side of the guard.

The design and construction of guards shall either

- be in accordance with the thickness and material in table 101;
- or
- comply with the requirements below.

*The grinder shall be fixed in a suitable position.*

*A non-reinforced abrasive product of maximum size and thickness as specified by the manufacturer or a particular test wheel of the same shape and mass, shall be run at the rated speed of the grinder. The wheel enclosed by the guard shall be subject to the following test:*

- *a burst shall be caused by a projectile to be fired at the wheel or by another suitable method. The test shall be carried out by bursting three wheels in succession in the same wheel guard;*
- *the wheel guard shall remain attached to the grinder, remain effective, and shall not show any visible cracks when examined by a recognised method of crack detection, e.g. dye penetration or magnetic crack detection. Minor deformations and superficial damage are acceptable. Any fixing devices, e.g. clamping devices and bolts, shall remain effective and subject to a critical examination for damage.*

NOTE – This test is dangerous and shall be carried out only in a properly constructed and equipped test facility. The test shall be performed inside a fully protected enclosure which can contain all the wheel fragments and other debris.

#### **18.1.103 Fixed guard**

The fixed guard shall be designed in such a way that the opening angle  $\alpha$  shall not exceed  $165^\circ$  (see figure 102).

To prevent ejection of broken parts of the wheel in front of the machine, the lower front part of the guard shall be below the horizontal plane crossing the spindle axis, for all positions of the arm ( $x > 0$ ).

If the movable guard is made of a steel sheet of at least the guard thickness  $P$  and if it overlaps the fixed guard, it can be used to ensure guarding against wheel breakage; in this case, the previous requirement  $x > 0$  does not apply.

#### **18.1.104 Movable guard**

In addition to the fixed guard, the movable guard shall be designed to prevent physical contact with the wheel.

The following minimum requirements shall be met.

The minimum dimensions are defined with the arm in the up position (see figures 103 and 104) so that

- distance “b” is reduced to a minimum for the arm movement to be free;
- dimensions “c” and “d” are larger than the maximum radius of the wheel.

Any gaps between fixed guards and movable guards shall not allow the standard test finger in figure 1 to touch the wheel.

The movable guard can be either plain, wire-netting or perforated. In the last two cases, the openings shall satisfy the test finger requirements of part 1.

In detail:

- if an overlapping “a” is foreseen between the fixed guard and the movable guard (see figure 103), it shall be sufficient to prevent the access to the wheel in the overlapping area;
- if there is no overlapping, the clearance between the fixed guard and the movable guard shall not exceed 4 mm (corresponding to the positions “e1”, “e2” and “e3” of figure 104).

The tool shall be so designed that during the operations of loading-unloading of parts, the movable guard cannot be lifted inadvertently.

The tool shall also be designed so as to avoid any inadvertent dropping of the movable guard, where it is necessary to lift it to replace the wheel.

### 18.1.105

Tools shall have a rear guard behind the wheel to prevent the ejection of the sparks, broken wheels and other debris. The rear guard shall comply with the requirements of figure 105 as follows:

- its height above the table of the tool shall be such that, the arm being in the up position, the upper part of this guard is above the tangent from the lower rear part of the fixed guard to the wheel ( $g > 0$ );
- its width, symmetrical from the wheel plane, shall be such that the angle alpha ( $\alpha$ ) from the centre of the wheel to the side of the rear guard is at least  $18^\circ$ .

**18.3** This subclause of part 1 is not applicable.

### 18.101 Workpiece fixing device

Tools shall have a workpiece fixing device which shall be fixed to the table. It shall be possible to operate the workpiece fixing device without removing the guards. The height of the jaws shall be at least half of the maximum depth of the cut of the cutting-off grinder.

The clamping jaws shall be adjustable so as to clamp all sizes of workpiece up to the maximum capacity.

### 18.102 Straight recessed flanges

The flanges shall comply with the following:

Where the peripheral speed of the abrasive wheel is  $\leq 63$  m/s:

$$d_f \geq 0,2 D$$

$$r \geq 0,17 d_f$$

$$h \geq 0,17 M$$

$$t = 1,0 \text{ mm nominal}$$

Where the peripheral speed is > 63 m/s

$$d_f \geq 0,25 D$$

$$r \geq 0,17 d_f$$

$$h \geq 0,17 M$$

$$t = 1,0 \text{ mm nominal}$$

Where (see figure 106):

$D$  is the diameter of the abrasive wheel in millimetres

$d_f$  is the diameter of the flange in millimetres

$h$  is the annular width of the flange in millimetres

$r$  is the width of the gripping surface of the flange in millimetres

$M$  is the annular width of the abrasive wheel in millimetres

$t$  is the depth of the recess

A flange set shall have the same contact diameter ( $d_f$ ) and width of gripping surface ( $r$ ) for both flanges. At least one of the flanges shall be keyed, threaded or shrunk on to the tool spindle.

### 18.103 Tool spindle

#### 18.103.1 Characteristics and dimensions

The spindle shall be made of steel with a tensile strength of at least 650 N/mm<sup>2</sup> and an elongation of at least 10 %.

#### 18.103.2 Spindle end

The cutting-off grinders shall be designed so as to prevent the abrasive from coming loose under working conditions.

*Compliance is checked by inspection.*

### 18.104

Cutting-off grinders shall have provisions so the wheel cannot be touched from under the table.

## 19 Mechanical strength

This clause of part 1 is applicable.

## 20 Construction

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

#### 20.17 Addition:

Cutting-off grinders shall be designed so that when the operating handle (see item 6 in figure 101) is released, the tool automatically returns to its rest position.

#### 20.18 Addition:

The actuation of the mains switch or control device shall not be affected, nor access to the switch or control device be restricted, by adjustment of the table or by the workpiece.

**20.101** Cutting-off grinders may have either dust extraction and collection facilities or devices for the connection of external dust extraction and collection equipment.

## **21 Internal wiring**

This clause of part 1 is applicable.

## **22 Components**

This clause of part 1 is applicable.

## **23 Supply connection and external flexible cables and cords**

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

### **23.2 Replacement:**

Non-detachable flexible cables and cords shall not be lighter than ordinary polychloroprene sheathed flexible cable (code designation 60245 IEC 57).

## **24 Terminals for external conductors**

This clause of part 1 is applicable.

## **25 Provision for earthing**

This clause of part 1 is applicable.

## **26 Screws and connections**

This clause of part 1 is applicable.

## **27 Creepage distances, clearances and distance through insulation**

This clause of part 1 is applicable.

## **28 Resistance to heat, fire and tracking**

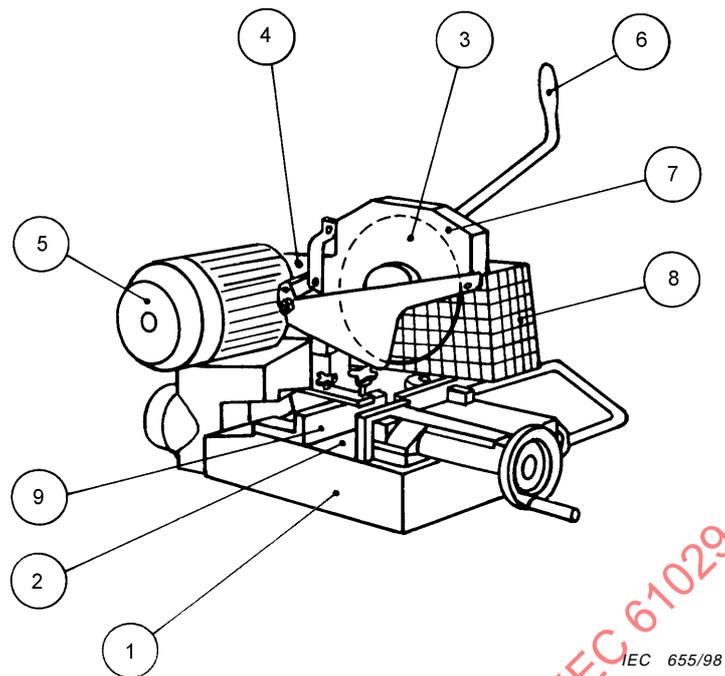
This clause of part 1 is applicable.

## **29 Resistance to rusting**

This clause of part 1 is applicable.

## **30 Radiation**

This clause of part 1 is applicable.



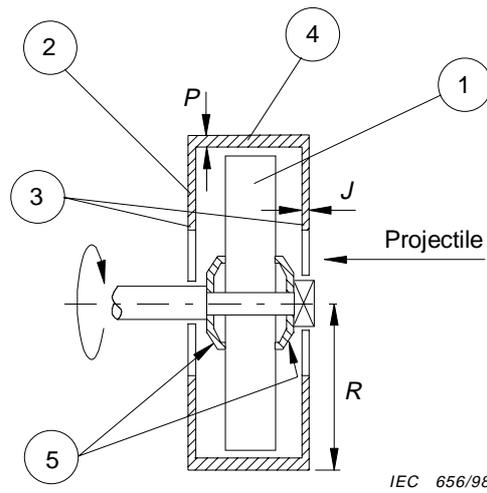
- 1 Bench
- 2 Table
- 3 Wheel
- 4 Arm
- 5 Motor
- 6 Operating handle
- 7 Fixed guard
- 8 Movable guard
- 9 Fixing device for workpieces

NOTE – The drawing is given as a guide only.

**Figure 101 – Cutting-off grinder**

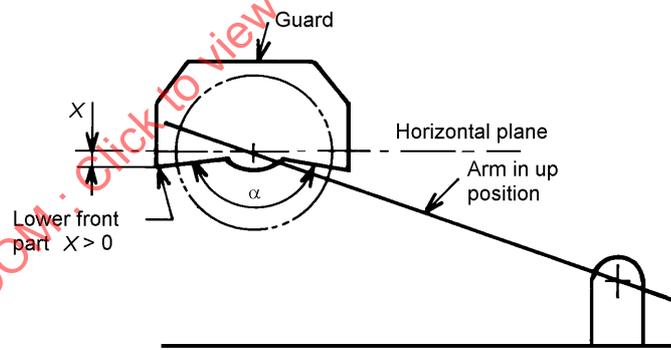
IEC 655/98

IECNORM.COM : Click to view the full PDF of IEC 61029-2-10:1998



- 1 Wheel
- 2 Guard
- 3 Guard sides
- 4 Guard periphery
- 5 Flanges
- P Guard thickness of periphery
- J Guard thickness of sides
- L Guard width
- R Guard inside radius

Figure 102a



IEC 657/98

Figure 102b

Figure 102 - Fixed guard