

Safety of transportable motor-operated electric tools —

Part 2-9: Particular requirements for mitre saws

The European Standard EN 61029-2-9:2002 has the status of a
British Standard

ICS 25.080.60; 25.140.20

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National foreword

This British Standard is the official English language version of EN 61029-2-9:2002. It was derived by CENELEC from IEC 61029-2-9:1995.

The common modifications have been implemented by CENELEC and are indicated in the text by a vertical line in the left margin.

The UK participation in its preparation was entrusted by Technical Committee CPL/61, Safety of household and similar electrical appliances, to Subcommittee CPL/61/6, Portable motor-operated tools, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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

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EUROPEAN STANDARD

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English version

Safety of transportable motor-operated electric tools
Part 2-9: Particular requirements for mitre saws
(IEC 61029-2-9:1995, modified)

Sécurité des machines-outils
électriques semi-fixes
Partie 2-9: Règles particulières
pour les scies à onglet
(CEI 61029-2-9:1995, modifiée)

Sicherheit transportabler
motorbetriebener Elektrowerkzeuge
Teil 2-9: Besondere Anforderungen
für Gehrungskappsägen
(IEC 61029-2-9:1995, modifiziert)

This European Standard was approved by CENELEC on 2002-09-24. 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.

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CENELEC

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

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Foreword

The text of the International Standard IEC 61029-2-9:1995, has been prepared by SC 61F, Safety of hand-held motor-operated electric tools, of IEC TC 61, Safety of household and similar electrical appliances, together with the common modifications prepared by the Technical Committee CENELEC TC 61F, Safety of hand-held and transportable electric motor-operated tools, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 61029-2-9 on 2002-03-01.

A draft for an amendment (prAA) was submitted to the formal vote and was approved by CENELEC for incorporation into EN 61029-2-9 on 2002-09-24.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2003-10-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-10-01

In this document the common modifications to the International Standard are indicated by a vertical line in the left margin of the text.

This standard is divided into two parts:

- Part 1 General requirements, which are common to most transportable motor, operated tools (for the purpose of this standard referred to simple as tools) which could come within the scope of this standard.
- Part 2 Requirements for particular types of tool 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 a mandate given to CEN/CENELEC by the European Commission and European Free Trade Association and supports the essential health and safety requirements of the Machinery Directive.

Compliance with the relevant clauses of part 1 together with this part 2 provides one means of confirming with the specified essential health and safety requirements of the Directive. The requirements defined in EN 1050 are also dealt with in this standard.

For noise and vibration this standard covers the requirements for their measurement, the provisions of information arising from these measurements and the provision of information about the personal protective equipment required. Specific requirements for the reduction of the risk arising from noise and vibration through the design of the tool are not given as this reflects the current state of the art.

Warning: Other requirements arising from other European Directives can be applicable to the products falling within the scope of this standard.

CEN have prepared standards for wood working machines, which may include transportable machines. Although CEN and CENELEC have, where appropriate, used common solutions to provide uniform levels of protection, persons using this standard should check the scope of both this and CEN standards to ensure that a correct standard is used. Where necessary, normative reference is made to these standards in this part 2.

Part 2-9 is to be used in conjunction with EN 61029-1:2000.

Part 2-9 supplements or modifies the corresponding clauses of EN 61029-1, so as to convert it into the European Standard: Safety requirements for transportable mitre saws.

Where a particular subclause of part 1 is not mentioned in this part 2-9, that subclause applies as far as is reasonable. Where this part 2-9 states "addition", "modification" or "replacement", the relevant text of 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 61029-2-9 are prefixed "Z"

NOTE In this standard the following print types are used:

- Requirements proper;
- *Test specifications*;
- Explanatory matter.

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1 Scope

This clause of part 1 is applicable except as follows:

1.1 *Addition:*

This European Standard applies to transportable mitre saws with a blade diameter not exceeding 350 mm. intended for cutting wood and analogue materials.

1.2 *Addition:*

This standard does not apply to transportable mitre saws used to cut steel, brass or food.

Mitre saws for cutting wood other than transportable are covered by EN 1870-3.

Tools combining the function of a mitre saw with the function of a circular saw bench are covered by EN 61029-2-11.

2 Definitions

This clause of part 1 is applicable except as follows:

2.21 *Replacement:*

2.21

normal load

the load to obtain rated input

2.101

mitre saw

a saw consisting of a table which supports and positions the workpiece and a saw unit fitted to an arm which projects over the table, normally from a pivot located at the table or on part of the frame of the machine.

A sliding movement of the saw unit may follow the chop action of the saw blade. For cutting purpose, the work piece is manually positioned against a fence

2.2.Z101

transportable mitre saw

a mitre saw used on a bench, or table or any supporting means, similar to a bench which is intended to carry out work in a stationary position and is capable of being lifted by one person by hand

3 General requirement

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 and information for use

This clause of part 1 is applicable except as follows:

7.1 Addition:

Mitre saws shall be marked with:

- maximum and minimum saw blade diameter;
- rated no-load speed;
- indication of direction of rotation of the saw blade;
- saw blade bore diameter.

Mitre saws which may be adjusted to different no-load speeds shall be marked, close to the means of adjustment.

This may be explained by means of drawings or diagrams, etc.

7.6 Addition:

The direction of rotation of the blade shall be indicated on a fixed part of the mitre saw in the vicinity of the spindle axis by an arrow raised or sunk, which is visible when changing the blade, or by any other means not less visible and indelible.

7.13 Addition:

The substance of the following instructions shall also be given:

c) Safety precautions

- do not use saw blades which are damaged or deformed;
- replace the table insert when worn;

- use only saw blades recommended by the manufacturer which conform to EN 847-1;
- do not use saw blades manufactured from high speed steel;
- wear suitable personal protective equipment when necessary, this could include:
 - hearing protection to reduce the risk of induced hearing loss;
 - eye protection;
 - respiratory protection to reduce the risk of inhalation of harmful dust;
 - gloves for handling saw blades (saw blades shall be carried in a holder wherever practicable) and rough material;
- connect the saw to a dust collecting device when sawing wood. In addition the operator shall be informed of factors that influence exposure of dust and the precautions mentioned e.g. type of material to be machined and the importance of local extraction (capture or source) and proper adjustment of hoods/baffles/chutes;

The results of the dust collection test carried out in accordance with 13.1 shall be stated.

d) Maintenance and servicing

- operator's instructions on factors influencing exposure to noise (e.g. use of saw blades designed to reduce the emitted noise, saw blade and machine maintenance);
- report faults in the machine, including guards or saw blades, as soon as they are discovered.

e) Safe operation

- select the correct saw blade for the material to be cut;
- do not use the saw to cut other materials than those recommended by the manufacturer;
- lifting and transportation information: Information shall include where to lift and support the mitre saw and when necessary a warning not to use guards for this purpose;
- do not use the saw without the guards in position, in good working order and properly maintained;
- ensure that the arm is securely fixed when bevelling;
- keep the floor area around the machine level, well maintained and free of loose materials e.g. chips and cut-offs;
- provide adequate general or localised lighting;
- the operator is adequately trained in the use, adjustment and operation of the machine;

- use correctly sharpened saw blades. Observe the maximum speed marked on the saw blade;
- ensure that any spacers and spindle rings used are suitable for the purpose as stated by the manufacturer;
- when fitted with laser, no exchange with different type of laser is permitted. Repairs shall only be carried out by the laser manufacturer or an authorised agent;
- blade replacement procedure including the method for repositioning and a warning that this must be carried out correctly;
- refrain from removing any cut-offs or other parts of the workpiece from the cutting area whilst the machine is running and the saw head is not in the rest position;
- ensure that the machine is always fixed to a bench, whenever possible;
- how to support long workpieces.

The following information shall also be given:

- the range of outside diameter, bore diameter and thickness of blades which may be used;
- maximum depth of cut;
- if double bevelling is possible, the safe method of operation;
- description of residual risks.

Drawings or diagrams may be used to illustrate the modes of operation.

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 Environmental requirements

This clause of part 1 is applicable except as follows:

13.1 *Replacement:*

The tests under working conditions, orientation within the cabin and the material to be worked shall be in accordance with Table Z101:

Table Z101 - Conditions for dust measurements

Material	Beech – 20 mm x 2/3rds maximum cutting width but not more than 200 mm – planed on four sides
Feed speed	At a brisk pace without overloading the tool
Width of cut-off	15 mm minimum at 90° crosscut
Tool bit	New blade at the start of the test, tungsten carbide tipped for crosscutting and having the maximum diameters as recommended by the manufacturer.
Orientation	Across the width of the cabin with the air flow from left to right of the operator (see Figure Z101)
Test cycle	Five cuts per minute across the width of the work piece for 10 min, followed by 2 min rest time (total 12 min)
Test period	Five complete cycles (total 1 h)

13.2.1 *Addition:*

The most important sources of noise are:

- the saw blade;
- the gear;
- the motor / the fan;
- the workpiece.

For general information concerning the reduction of noise, see EN ISO 11688-1.

13.2.4 Replacement of paragraphs 1, 2 and 3:

Mitre saws are tested under load under the conditions shown in Table Z102.

Table Z102 - Noise test conditions for mitre saws

Material	Beech – 20 mm x 2/3rds maximum cutting width but not more than 200 mm – planed on four sides
Feed speed	At a brisk pace without overloading the machine
Width of cut-off	15 mm minimum at 90° crosscut
Test work cycle	Five cuts quickly following each other The sound pressure is averaged over the test work cycle
Tool bit	New blade at the start of the test, tungsten carbide tipped for crosscutting and having the maximum diameter as recommended by the manufacturer
Test position	To be used on a bench above reflecting plane as shown in EN 61029-1:2000, Figure 12

13.3.8 Addition:

Mitre saws are tested only at no-load.

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, except as follows:

17.1 Addition:

Mitre saws equipped with an induction motor are considered to be tools in which moving parts are liable to be jammed.

18 Stability and mechanical hazards

This clause of part 1 is applicable except as follows.

18.1 Addition

Mitre saws 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.

18.1.101 Blade guards

Mitre saws shall be provided with a combination of fixed and self-closing guard.

The areas 1 and 2 of the machine are described in Figure Z102. The area 1 shall be permanently guarded with a guard which as a minimum covers the periphery of the saw blade and both sides of the saw teeth down at least to the level of the base of the teeth independent of the position of the saw unit.

In the rest position the area 2 shall be guarded by a combination of fixed and self-closing guard which as a minimum covers the periphery of the saw blade and both sides of the saw teeth down at least to the level of the base of the teeth. See Figure Z102 for illustration.

The guard shall comply with this requirement at any mitre and bevel position which is possible.

The self-closing guard shall be either:

- a) of a U-shaped construction, see Figure Z103, spring loaded closing or to be connected in a positive mode with the saw unit, which encloses the teeth of the blade.
Positive mode means, the opening and closing of the guard is related to the corresponding up and down movement of the saw unit.

The guard shall be completely closed in the rest position and shall be opened either

- for an angle of max. 60° to a perpendicular line through the spindle axis by manually actuating the release device,

or

- when the saw unit is moved down to come into contact with the workpiece.

or

- b) of an open guard construction, see Figure Z104, which only covers both sides of the saw blade teeth which extends beyond the periphery of the saw blade in accordance with the dimensions given in Figure Z105 and shall open when it makes contact with the workpiece or the fence. The guard shall lie on the workpiece or on the fence during cutting to afford maximum protection.

For mitre saws provided with spring loaded guard and having a blade diameter less than 210 mm, the closing time of the self-closing guard from the fully open position to the fully closed position shall not exceed 0,2 seconds.

For mitre saws provided with spring loaded guard having a blade diameter 210 mm and above, the closing time of the self-closing guard from the fully open position to the fully closed position in seconds, shall be less than the numerical equivalent of the largest recommended blade diameter, expressed in metres, but not more than 0,3 seconds. During the measurement, the saw unit is set to cut at right angle.

All types of guard shall allow changing of the saw blade without removing the guard from the machine.

In the rest position of the saw unit the guard shall be locked.

When set for transportation the self-closing guard shall cover the teeth of the blade to the front of the machine.

Mitre saws shall be so guarded that the saw blade cannot be touched from under the mitre saw table.

Compliance is checked by the following test.

By applying the test probe of Figure Z106 in any possible position, it shall not be possible to touch the teeth of the blade.

18.1.102 Saw table

18.1.102.1 The slot in the table for the saw blade shall be in accordance with the dimension given in Figure Z107. The area surrounding the saw blade where it passes through the table shall be of material such as plastic, wood or aluminium.

Compliance is checked by inspection and by measurement.

18.1.102.2 The table shall be designed so that the workpiece support shall extend $\frac{3}{4} D$ where D is the diameter of the saw blade, or at least 180 mm, whichever is greater, on either side of the cutting line when the saw blade is in 90° position to the fence.

Compliance is checked by inspection and by measurement.

18.1.103 Table fence

A fence shall be provided which extends over the total length of the table and shall, outside the bevel area, have a height at least equal to 0,6 times the maximum depth of cut (see Figures Z103 and Z104).

The part of the fence adjacent to the blade shall be made from material such as aluminium, plastic or wood. On mitre saws with the facility to perform angled or bevelled cuts, the fence shall have an adequate clearance, e.g. by an adjustable part what is removable by aid of a tool only, to realise this feature.

Compliance is checked by inspection and by measurement.

18.1.104 Flanges

The outer diameter of the contact surface shall be not less 0,2 times the rated blade diameter and at least one of the flanges shall be locked or keyed to the output spindle. The overlap of the clamping area of the two flanges shall be at least 1,5 mm wide as specified in Figure Z107.

Compliance is checked by inspection and by measurement.

18.1.105 Chip outlet

The construction of the chip ejection opening shall be such that particles are not ejected in the direction of the operator when not connected to a chip/dust extraction device.

It shall not be possible to gain access to the saw blade through the outlet opening.

Compliance is checked by applying the test probe (see Figure Z106).

18.1.106 Return device of the saw unit

Mitre saws shall be designed so that when the handle is released the saw unit moves automatically up from each intermediate position to its rest position and shall automatically either be locked in this position or lock the self-closing guard in the closed position. It shall be possible for an operator to unlock the device without having to release their grip on the handle. The time needed for the back stroke from the lowest position of the saw unit to its rest position shall not exceed two seconds.

When the return of the saw unit to its rest position is performed by springs the saw shall be designed adopting one of the following features:

- 1 compression spring,
- or 2 traction or 2 torsion springs,
- or 1 torsion spring.

In case of one torsion spring made for high endurance life time, evidence shall be given by fatigue loading calculation or the spring has to withstand at least 100 000 cycles up and down.

In the second configuration the springs shall be so designed that it is avoided that the saw unit falls down in case of failure of one of the springs.

Compliance is checked by inspection, by measurement and by test.

18.2 Replacement:

In working position the machine shall have sufficient stability. Mitre saws shall be provided with the facility to fix the machine to a bench (e.g. by providing holes in the machine frame).

The machine shall be in compliance with the following tests:

- 1) A beech workpiece, which has the maximum permitted width, is two times the blade diameter in length and 0,5 times the rated cutting depth in height; is fixed to the table against the fence and with one end aligned with the cutting slot. The machine shall maintain in its position without any intervention from the operator.
- 2) Stability will also be checked by moving the saw unit down to its lowest possible position and then release the handle. The machine shall not turn over and shall not be displaced over a distance of more than 100 mm. The test has to be performed three times.

19 Mechanical strength

This clause of part 1 is applicable except as follows:

19.1 Addition:

The fixed guard for the saw blade shall be manufactured from:

- a) steel having the following characteristics:

Ultimate tensile strength	Minimum thickness
N/mm ²	mm
350	1,50
380	1,25

- b) light alloy having the following characteristics:

Ultimate tensile strength	Minimum thickness
N/mm ²	mm
300	2,0
360	1,5

- c) polycarbonate with a wall thickness of at least 3 mm or other plastic material having an impact strength equal or better than polycarbonate of at least 3 mm thickness.

The self-closing saw blade guard shall also be in compliance with a), b) or c).

Compliance is checked by examining of the relevant drawings, by measurement and by inspection of the tool and by receipt of confirmation of the ultimate strength by the manufacturer of the material.

20 Construction

This clause of part 1 is applicable except as follows:

20.18 *Addition:*

The actuation of the mains switch or control device shall not be affected or restricted by the position of the table or by the workpiece.

20.20 *Addition:*

Mitre saws shall be equipped with a mains switch that interrupts the supply automatically when the operating means is released and there shall be no means for locking the switch in the ON position.

Mitre saws where the fixed guard protects the saw blade at least down to the level of the centre of spindle, see Figure Z109, may be equipped with a switch provided with a means to lock it in the ON position. In this case the machine shall not start automatically after voltage recovery following a voltage failure.

20.21 *Addition:*

Mitre saws are machines where a considerable amount of dust may be expected to be produced.

20.Z101 The run-down time shall not exceed 10 s.

Compliance is checked by measurement.

20.Z102 Handles shall be provided if the tool does not otherwise have equally effective lifting and transportation positions.

20.Z103 Saw blade(s) delivered with the machine shall comply with EN 847-1.

Compliance with 20.Z102 and 20.Z103 is checked by receipt of relevant information from the manufacturer of the saw blade.

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.

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 distances 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

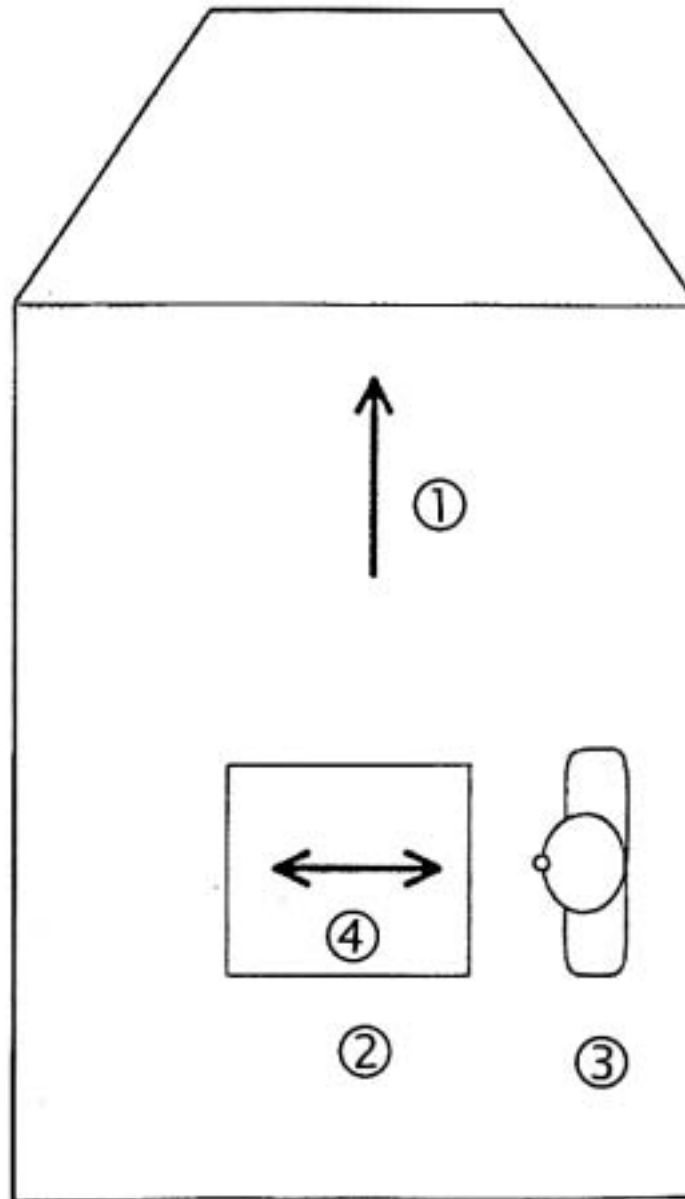
This clause of part 1 is applicable.

30 Radiation

This clause of part 1 is applicable except as follows:

Replacement

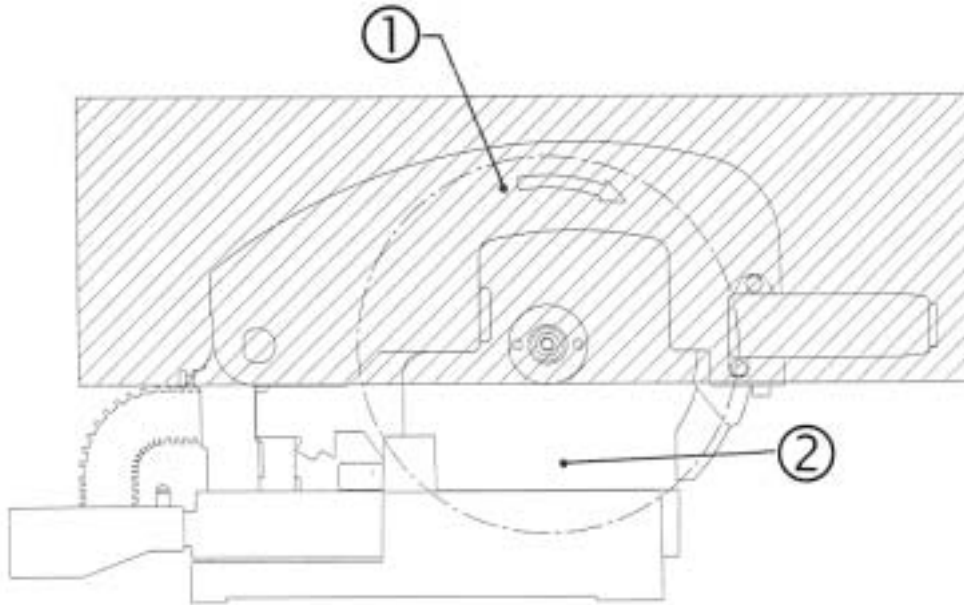
It the machine is fitted with a laser to indicated the cutting line the laser shall be of category IIIA or lower according to EN 60825-1:1994.



Key

- 1 Airflow
- 2 Test bench
- 3 Operator
- 4 Direction of the saw blade

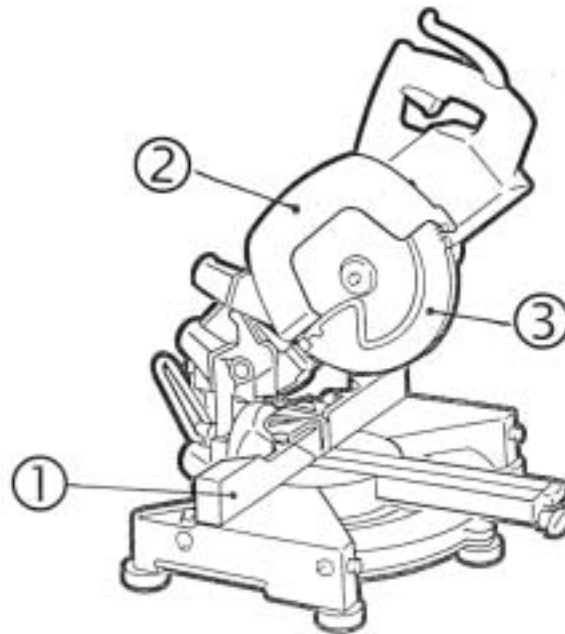
Figure Z101 - Orientation of tool and operator



Key

- 1 Permanently protected area
- 2 Area protected in rest position

Figure Z102 - Saw blade areas



Key

- 1 Fence
- 2 Fixed guard
- 3 Self-closing guard

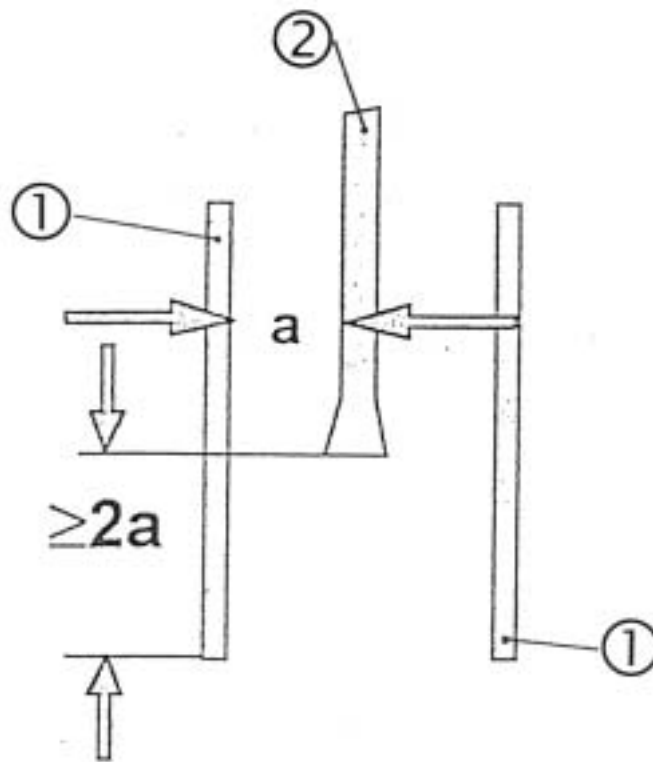
Figure Z103 - Mitre saw provided with U-shaped guard



Key

- 1 Fence
- 2 Fixed guard
- 3 Self-closing guard

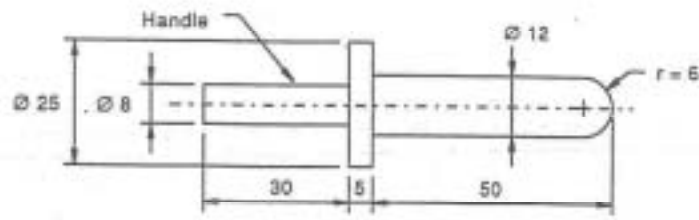
Figure Z104 - Mitre saw provided with open guard construction



Key

- 1 Guard
- 2 Saw blade

Figure Z105 - Open guard construction



Dimensions in millimetres

Figure Z106 - Dimensions test probe

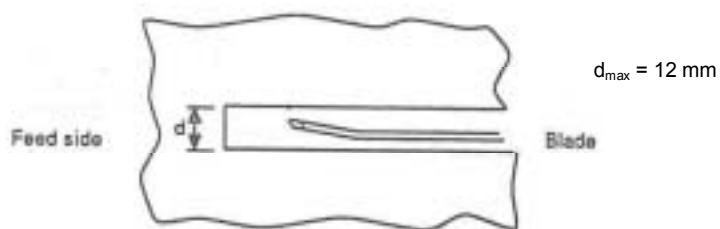
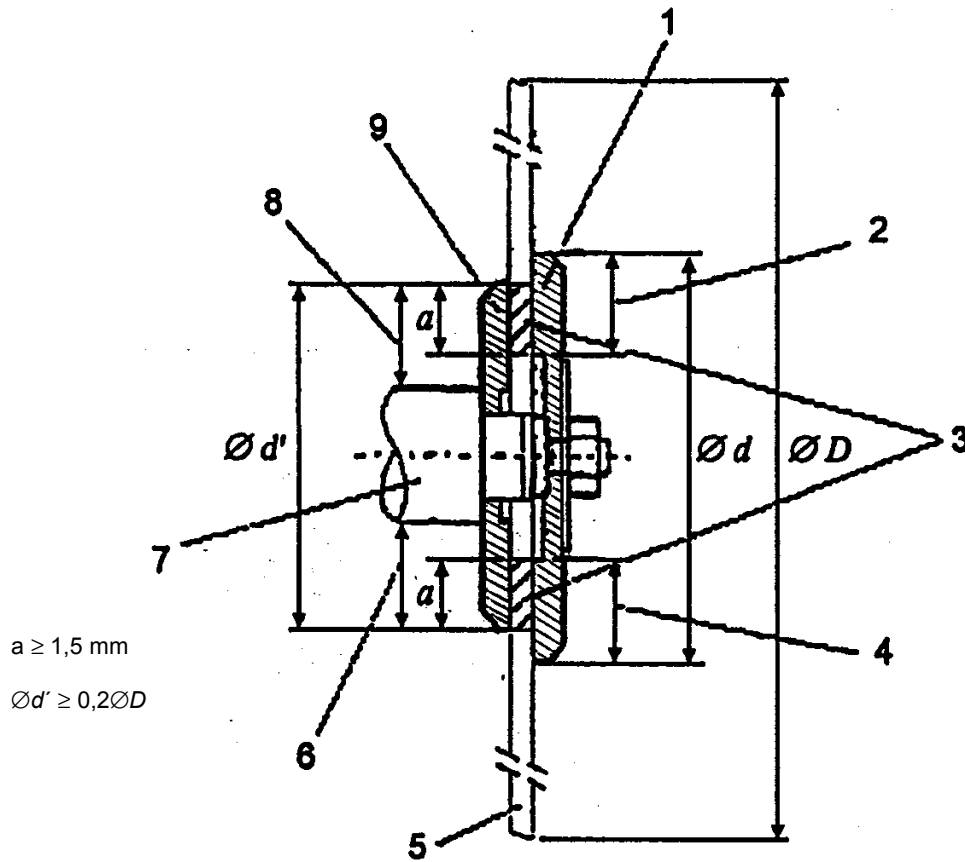


Figure Z107 - Dimensions of the slot in the table



$a \geq 1,5 \text{ mm}$
 $\text{Ø}d' \geq 0,2\text{Ø}D$

Key

- 1 Outer flange
- 2 Contact surface
- 3 Overlap surface
- 4 Contact surface
- 5 Blade
- 6 Clamping area
- 7 Output spindle
- 8 Clamping area
- 9 Inner flange

Figure Z108 - Flange characteristics

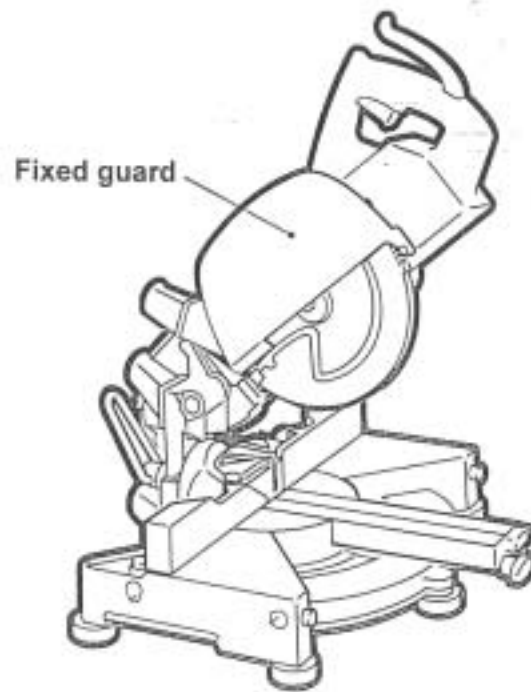


Figure Z109 - Fixed guard

Annexes

The annexes of part 1 are applicable except as follows:

Annex A
(normative)

Normative references

Addition:

<u>Publication</u>	<u>Date</u>	<u>Title</u>
EN 847-1	1997	Tools for woodworking - Safety requirements Part 1: Milling tools and circular saw blades
EN 1870-3	2001	Safety of woodworking machines - Circular sawing machines Part 3: Down cutting cross-cut saws and dual purpose down cutting cross-cut saws/circular saw benches
EN 60825-1 + A11	1994 1996	Safety of laser products Part 1: Equipment classification, requirements and user's guide (IEC 60825-1:1993)
EN 61029-2-11	¹⁾	Safety of transportable motor-operated electric tools Part 2: Particular requirements for combined mitre-bench saws (IEC 61029-2-11:2001, modified)
EN ISO 11688-1	1998	Acoustics - Recommended practice for the design of low-noise machinery and equipment Part 1: Planning (ISO/TR 11688-1:1995)

¹⁾ To be published.

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