IEC 62841-3-9

Edition 2.0 2020-02
REDLINE VERSION

INTERNATIONAL STANDARD

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Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety –
Part 3-9: Particular requirements for transportable mitre saws

IEC 62841-3-9:2020-02 RLV(en)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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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 redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 62841-3-9 has been prepared by IEC technical committee 116: Safety of motor-operated electric tools.

This second edition cancels and replaces the first edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Clause 1: Scope: increase of the maximum saw blade diameter to 410 mm;
b) Corrigendum 1 and Corrigendum 2 of the first edition have been incorporated in this second edition.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
116/430/FDIS	116/442/RVD

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

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

This Part 3-9 is to be used in conjunction with the IEC 62841-1:2014.

This Part 3-9 supplements or modifies the corresponding clauses in IEC 62841-1, so as to convert it into the IEC Standard: Particular requirements for transportable mitre saws.

Where a particular subclause of Part 1 is not mentioned in this Part 3-9, that subclause applies as far as reasonable. Where this standard states “addition”, “modification” or “replacement”, the relevant text in Part 1 is to be adapted accordingly.

The following print types are used:

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

The terms defined in Clause 3 are printed in **bold typeface**.

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

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 publication 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.

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 publication 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 3-9: Particular requirements for transportable mitre saws

1 Scope

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

Addition:

This part of IEC 62841 applies to transportable **mitre saws** intended to be used with a toothed saw blade for cutting wood and analogous materials, plastics and nonferrous metals except magnesium with a saw blade diameter not exceeding ~~360~~ 410 mm, which hereinafter might simply be referred to as saw or tool.

This International Standard does not apply to **mitre saws** intended to cut other metals, such as magnesium, steel and iron. This document does not apply to **mitre saws** with an automatic feeding device.

NOTE 101 Transportable saws intended to cut ferrous metals will be covered by a future part of IEC 62841-3.

This document does not apply to saws designed for use with abrasive wheels.

NOTE 102 **Transportable tools** designed for use with abrasive wheels are covered by IEC 62841-3-10.

This document does not apply to tools combining the function of a **mitre saw** with the function of a table saw.

NOTE 103 **Transportable tools** combining the function of a **mitre saw** with the function of a table saw are covered by ~~IEC 62841-3-11~~ a future part of IEC 62841-3.

2 Normative references

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

Addition:

ISO 180, *Plastics – Determination of Izod impact strength*

3 Terms and definitions

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

~~*Addition:*~~

3.101
bevel angle
angular displacement of the saw blade plane with respect to the **table top** plane, the position of the saw blade plane that is perpendicular to the **table top** being the 0° bevel position

3.102
compound angle
angular displacement of the saw blade plane having a **bevel** and **mitre angle** other than 0°

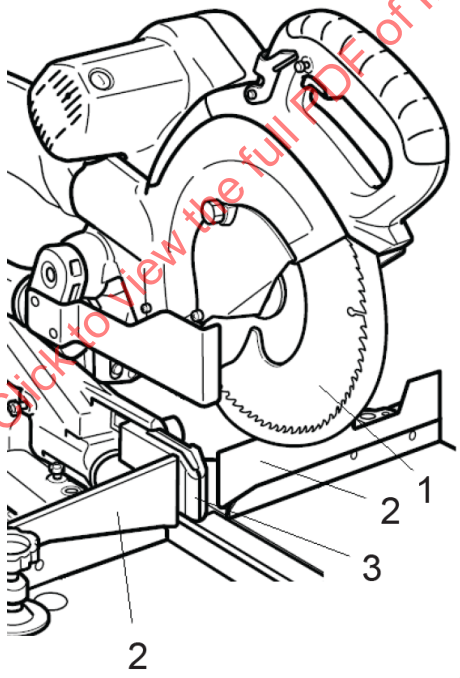
3.103
cutting edge zone
outer 20 % of the radius of the saw blade

3.104
D
specified diameter of the saw blade

3.105
fence
device to position the workpiece and absorb the horizontal forces from the saw blade during the cutting process

3.105.1
centre workpiece support
device that has a face supporting the workpiece in conjunction with the **fence**

Note 1 to entry: See Figure 101.



Key

1 saw blade

2 **fences**

3 **centre workpiece support**

Figure 101 – Mitre saw with centre workpiece support

3.106
fully down position
position of the **saw unit** after adjustment of the saw in accordance with 8.14.2 a) 107) and any depth-of-cut stop as in 8.14.2 a) 108) disengaged or adjusted in order to produce the lowest position of the **saw unit**

3.107
horizontal cutting capacity
largest dimension perpendicular from the plane of the **fence** (width) of a workpiece with rectangular cross section that can be completely cut through with a single pass of the saw blade

Note 1 to entry: Subclause 5.101 provides a measurement procedure for **horizontal cutting capacity**.

3.108
kerf width
distance between two parallel planes that are touching the opposing sides of at least three saw blade tooth tips

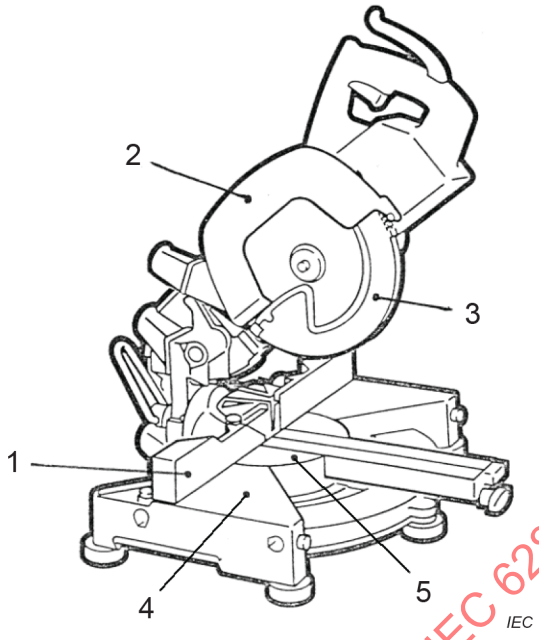
3.109
kerf plate
portion of the **table top** on both sides of the saw blade intersect line with the **table top** for the purpose of minimizing the tearing of the wood fibres by the saw blade

Note 1 to entry: Depending on the design, the **kerf plate** is adjustable, replaceable or an integral part of the **table top**.

3.110
mitre angle
angular displacement of the plane of the **fence** with respect to the cutting line, the position of the saw blade plane that is perpendicular to the plane of the **fence** being the 0° mitre position

3.111
mitre saw
saw consisting of a **table top** and a **fence** which support and position the workpiece, and a **saw unit**, projecting over the **table top**

Note 1 to entry: Cutting is achieved by moving the **saw unit** through a plunging action or a combination of plunging and sliding actions. The workpiece does not move with respect to the **table top** or **fence** during cutting. The **saw unit** can be adjustable to cut at a **bevel angle**, a **mitre angle** or both angles to create a **compound angle** cut. See Figure 102.



Key

1 **fence**

2 upper **guard**

3 lower **guard**

4 table base

5 **turn table**

Figure 102 – Mitre saw

3.112
quadrants ~~(of the saw blade)~~
with the **saw unit** in the **fully down position**, parts of the saw blade ~~quadrants are~~ defined by two lines intersecting the centre of the saw blade, where one line is parallel to the **table top** and the other line is perpendicular to the first line

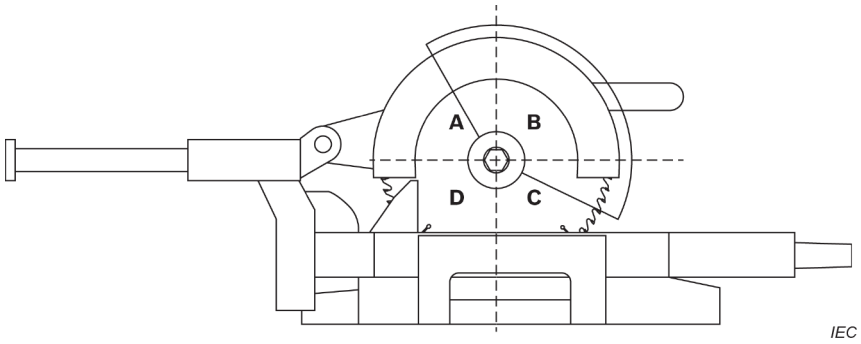
Note 1 to entry: The **quadrants** remain fixed in relation to the **saw unit** as it moves between the **rest position** and the **fully down position** (see Figure 103):

– **quadrant** "A" is above the line parallel to the **table top** and away from the operator's position;

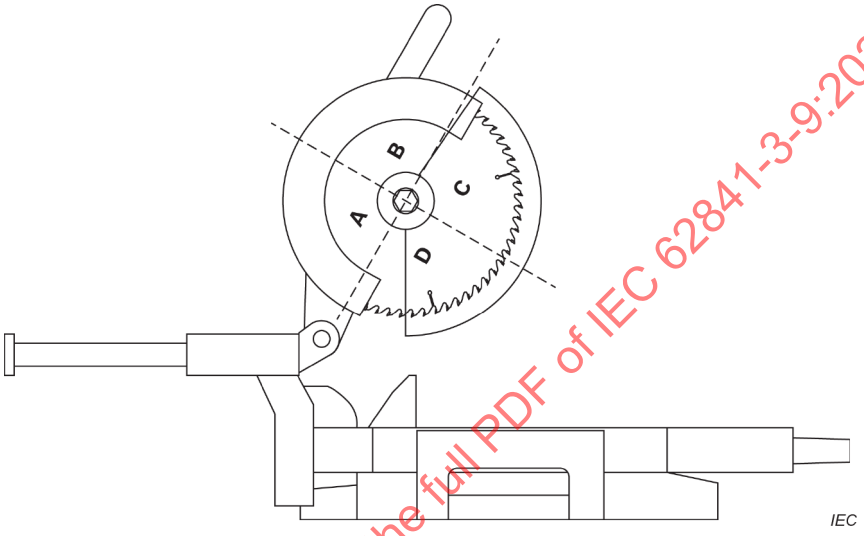
– **quadrant** "B" is above the line parallel to the **table top** and closer to the operator's position;

– **quadrant** "C" is below the line parallel to the **table top** and closer to the operator's position;

– **quadrant** "D" is below the line parallel to the **table top** and away from the operator's position.



a) Saw unit in fully down position



b) Saw unit in rest position

Figure 103 – Saw blade quadrants

3.113
rest position
position of a **saw unit** in its uppermost position from the **table top** and, for **mitre saws** with a sliding action, at the maximum sliding position towards the **fence**

3.114
saw unit
device with an affixed saw blade, capable of performing a cutting action

3.115
table top
horizontal surface that is in contact with and supports the workpiece and typically consists of a **turn table,** a table base on each side of the **turn table** and workpiece support extension(s)

Note 1 to entry: See Figure 102.

3.116
turn table
workpiece supporting device that facilitates the **mitre angle** adjustment

3.117
vertical cutting capacity
largest height dimension above the **table top** (thickness) of a workpiece with rectangular cross section having a width dimension equal to the **horizontal cutting capacity**, that can be completely cut through with a single pass of the saw blade

4 General requirements

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

~~*Addition:*~~

4.101 Throughout the remaining part of this document, unless otherwise explicitly stated, whenever a requirement or a reference is made to

– "saw blade":

this shall equally apply to any "saw blade" as specified in accordance with 8.14.2 a);

– "force" as a multiple of ***D***:

the force shall be expressed in newtons (N) and the saw blade diameter ***D*** shall be expressed in millimetres (mm).

5 General conditions for the tests

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

5.17 *Addition:*

*The mass of the tool shall include the **fences** and required workpiece clamp(s) in accordance with 21.103 and 21.104. Further parts such as carrying means that are required in accordance with the instructions for the safe use of the tool shall be included in the mass.*

5.101 Procedure to determine the horizontal cutting capacity

*The **mitre saw** is fitted with a (2 ± 0,2) mm thick steel disc of diameter **D** in place of the saw blade and is set to 0° **bevel angle**. The **saw unit** is at its **fully down position** and, for a **mitre saw** with a sliding function, the **saw unit** is at its maximum extended horizontal position from the **fence**. The **mitre saw** is set for the **mitre angle** for which the **horizontal cutting capacity** measurement is desired.*

Horizontal cutting capacity:

*The **horizontal cutting capacity** is the perpendicular distance measured in the plane of the **table top** from the **fence** to the intersect point of the steel disc periphery in **quadrant** "C" with the plane of the **table top**.*

6 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

7 Classification

This clause of Part 1 is applicable.

8 Marking and instructions

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

8.1 *Addition:*

Mitre saws shall be marked with:

– **rated no-load speed** of the output spindle.

8.3 *Addition:*

Mitre saws shall be marked with the saw blade diameter(s). The marked value(s) shall not be larger than ***D*** and shall not be less than 0,96 ***D***.

Mitre saws shall be marked with the direction of rotation of the spindle, indicated in a visible location on the tool in the vicinity of the saw blade, such as on the saw blade **guard**, by an arrow raised or recessed or by any other means no less visible and indelible.

The **table top** on each side of the saw blade shall be marked with a sign as follows:

This symbol needs not be in accordance with the colour requirements of ISO 3864-2.

8.14.1 *Addition:*

The additional safety instructions as specified in 8.14.1.101 shall be given. This part may be printed separately from the "General Power Tool Safety Warnings".

8.14.1.101 Safety instructions for mitre saws

a) **Mitre saws are intended to cut wood or wood-like products, they cannot be used with abrasive cut-off wheels for cutting ferrous material such as bars, rods, studs, etc.** *Abrasive dust causes moving parts such as the lower guard to jam. Sparks from abrasive cutting will burn the lower guard, the kerf insert and other plastic parts.*

b) **Use clamps to support the workpiece whenever possible. If supporting the workpiece by hand, you must always keep your hand at least 100 mm from either side of the saw blade. Do not use this saw to cut pieces that are too small to be securely clamped or held by hand.** *If your hand is placed too close to the saw blade, there is an increased risk of injury from blade contact.*

c) **The workpiece must be stationary and clamped or held against both the fence and the table. Do not feed the workpiece into the blade or cut "freehand" in any way.** *Unrestrained or moving workpieces could be thrown at high speeds, causing injury.*

d) **Push the saw through the workpiece. Do not pull the saw through the workpiece. To make a cut, raise the saw head and pull it out over the workpiece without cutting, start the motor, press the saw head down and push the saw through the workpiece.** *Cutting on the pull stroke is likely to cause the saw blade to climb on top of the workpiece and violently throw the blade assembly towards the operator.*

NOTE 1 The above warning is omitted for a simple pivoting arm **mitre saw**.

e) **Never cross your hand over the intended line of cutting either in front or behind the saw blade.** *Supporting the workpiece "cross handed" i.e. holding the workpiece to the right of the saw blade with your left hand or vice versa is very dangerous.*

f) **Do not reach behind the fence with either hand closer than 100 mm from either side of the saw blade, to remove wood scraps, or for any other reason while the blade is**

spinning. *The proximity of the spinning saw blade to your hand may not be obvious and you may be seriously injured.*

g) **Inspect your workpiece before cutting. If the workpiece is bowed or warped, clamp it with the outside bowed face toward the fence. Always make certain that there is no gap between the workpiece, fence and table along the line of the cut.** *Bent or warped workpieces can twist or shift and may cause binding on the spinning saw blade while cutting. There should be no nails or foreign objects in the workpiece.*

h) **Do not use the saw until the table is clear of all tools, wood scraps, etc., except for the workpiece.** *Small debris or loose pieces of wood or other objects that contact the revolving blade can be thrown with high speed.*

i) **Cut only one workpiece at a time.** *Stacked multiple workpieces cannot be adequately clamped or braced and may bind on the blade or shift during cutting.*

j) **Ensure the mitre saw is mounted or placed on a level, firm work surface before use.** *A level and firm work surface reduces the risk of the mitre saw becoming unstable.*

k) **Plan your work. Every time you change the bevel or mitre angle setting, make sure the adjustable fence is set correctly to support the workpiece and will not interfere with the blade or the guarding system.** *Without turning the tool "ON" and with no workpiece on the table, move the saw blade through a complete simulated cut to assure there will be no interference or danger of cutting the fence.*

NOTE 2 The phrase "bevel or" does not apply for saws without bevel adjustment.

l) **Provide adequate support such as table extensions, saw horses, etc. for a workpiece that is wider or longer than the table top**. *Workpieces longer or wider than the mitre saw table can tip if not securely supported. If the cut-off piece or workpiece tips, it can lift the lower guard or be thrown by the spinning blade.*

m) **Do not use another person as a substitute for a table extension or as additional support.** *Unstable support for the workpiece can cause the blade to bind or the workpiece to shift during the cutting operation pulling you and the helper into the spinning blade.*

n) **The cut-off piece must not be jammed or pressed by any means against the spinning saw blade.** *If confined, i.e. using length stops, the cut-off piece could get wedged against the blade and thrown violently.*

o) **Always use a clamp or a fixture designed to properly support round material such as rods or tubing.** *Rods have a tendency to roll while being cut, causing the blade to "bite" and pull the work with your hand into the blade.*

p) **Let the blade reach full speed before contacting the workpiece.** *This will reduce the risk of the workpiece being thrown.*

q) **If the workpiece or blade becomes jammed, turn the mitre saw off. Wait for all moving parts to stop and disconnect the plug from the power source and/or remove the battery pack. Then work to free the jammed material.** *Continued sawing with a jammed workpiece could cause loss of control or damage to the mitre saw.*

r) **After finishing the cut, release the switch, hold the saw head down and wait for the blade to stop before removing the cut-off piece.** *Reaching with your hand near the coasting blade is dangerous.*

s) **Hold the handle firmly when making an incomplete cut or when releasing the switch before the saw head is completely in the down position.** *The braking action of the saw may cause the saw head to be suddenly pulled downward, causing a risk of injury.*

NOTE 3 The above warning applies only for **mitre saws** with a brake system.

8.14.2 a)

~~*Addition:*~~

101) Instruction to identify the correct saw blade to be used for the material to be cut;

102) Information about cutting capacities;

103) Information about maximum **bevel angle** and **mitre angle** settings, as applicable;

104) Instruction to use only a saw blade diameter in accordance with the markings on the saw and information about the bore diameter and the maximum **kerf width** of the saw blade;

105) Instruction to use only saw blades that are marked with a speed equal or higher than the speed marked on the tool;

106) Instructions for the saw blade changing procedure including proper saw blade direction installation;

107) Instructions for adjusting the saw for proper cutting capacity, if applicable;

108) Instruction how to properly use the setting device(s) and the locking device(s) for the saw blade depth-of-cut stop, **mitre angle** and **bevel angle**, as applicable;

109) Instruction how to align the **fence**, if applicable;

110) Instruction how to check that the saw blade **guards** are functioning correctly;

111) Instruction how to connect dust extraction systems;

112) For **mitre saws** with sliding function: Instruction for the cutting sequence;

113) Instructions on how to set the depth of cut of the saw blade for non-through cuts, as applicable;

114) Instruction to ensure that the **mitre saw** is always stable and secure (e.g. fixed to a bench) and instruction how to fix the machine to a workbench or the like;

115) If adjustable and/or removable workpiece support extension(s) are provided to comply with 21.102.1, instruction to always fix and use these extension(s) during operation;

116) Instruction to use additional supports if needed to ensure the stability of the workpiece.

8.14.2 b)

~~*Addition:*~~

101) Instruction on correct cutting operations, including cross cutting, **mitre angle** and **bevel angle** cutting procedures, as applicable;

102) Instruction on simple non-through cutting operations such as grooving/slotting;

103) Information about which materials can be cut. Instructions to avoid overheating the saw blade tips and, if cutting plastics is permitted, to avoid melting the plastic;

104) Instruction for proper use of the workpiece clamping device;

105) If the saw is provided with an interchangeable **kerf plate**: instructions how to remove and install the **kerf plate** and how to adjust the **kerf plate** height with respect to the **table top**, if applicable. Instruction to replace a worn **kerf plate**;

106) Instruction and the procedure to cut a slot in a zero clearance **kerf plate**, if applicable;

107) Instruction where to lift and support the **mitre saw** during transportation;

108) Instruction to avoid uncontrolled release of the **saw unit** from the **fully down position**.

8.14.2 c)

~~*Addition:*~~

101) Instruction how to properly clean the tool and the guarding system.

9 Protection against access to live parts

This clause of Part 1 is applicable.

10 Starting

This clause of Part 1 is applicable.

11 Input and current

This clause of Part 1 is applicable.

12 Heating

This clause of Part 1 is applicable.

13 Resistance to heat and fire

This clause of Part 1 is applicable.

14 Moisture resistance

This clause of Part 1 is applicable.

15 Resistance to rusting

This clause of Part 1 is applicable.

16 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

17 Endurance

This clause of Part 1 is applicable.

18 Abnormal operation

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

18.8 *Replacement of Table 4:*

Table 4 – Required performance levels

Type and purpose of SCF	Minimum Performance Level (PL)
Power switch – prevent unwanted switch-on	Shall be evaluated using the fault conditions of 18.6.1 without the loss of this **SCF**
Power switch – provide desired switch-off	Shall be evaluated using the fault conditions of 18.6.1 without the loss of this **SCF**
Provide desired direction of rotation	Shall be evaluated using the fault conditions of 18.6.1 without the loss of this **SCF**
Any electronic control to pass the test of 18.3	c
Over-speed prevention to prevent output speed above 130 % of **rated** ~~(~~**no-load**~~)~~ **speed**	c
Provide run-down time as required by 19.103	a
Lock-off function as required by 21.18.2.101	b
Lower **guard** – prevent unwanted retraction or release of the locking device	c
Prevent exceeding thermal limits as in Clause 18	a

19 Mechanical hazards

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

19.1 *Replacement of the first paragraph:*

Moving and dangerous parts other than the rotating saw blade shall be so arranged or enclosed that adequate protection against injury is provided. The guarding of the rotating blade is covered in 19.101.

19.3 *Replacement:*

It shall not be possible to reach hazardous moving parts through dust collection openings with the **detachable parts** or provisions for dust collection removed, if any.

Compliance is checked by the following test.

For dust collection openings, the test probe B of IEC 61032 is used. The test probe is inserted with a force not exceeding 5 N into the dust collection opening until the probe's stop face reaches the plane of the dust collection opening and shall not touch hazardous moving parts.

19.7.101 A **mitre saw** shall be constructed so that during ~~foreseeable misuse~~ operation it will not tip over ~~or move excessively~~ when the **saw unit** is inadvertently released from its **fully down position**.

*Compliance is checked by tests 1 and test 2, if applicable. The test 2 applies only if the **mitre saw** has a working stand either provided with the tool or specifically identified in accordance with 8.14.2. For both tests, the **mitre saw** is set to 0° **bevel angle** and the test is conducted at 0° and at maximum **mitre angle** settings. For **mitre saws** with a sliding action, the tests are conducted with the **saw unit** at its maximum and at its minimum extended position from the **fence**. If possible, the sliding mechanism is locked in the respective position. The tool is assembled in accordance with 8.14.2 a) 2) and fitted with a (2 ± 0,2) mm steel disc of diameter **D**.*

1) *The **mitre saw**, without a working stand and without being fixed to the supporting surface, is placed on horizontal medium density fibreboard (MDF) having a density of 650 kg/m^3*

*to 850 kg/m^3. An MDF workpiece of the same density as above, (20 ± 2) mm thick, 50 % of **horizontal cutting capacity** wide, a length equal to the length of the **table top** as required in 21.102 and divided with a **kerf width** to accommodate the saw blade, is positioned against the **fence** and the **saw unit** is moved down to its **fully down position**, and then the handle is released. The **mitre saw** shall not tip over.*

2) *The test is repeated with the **mitre saw** mounted to the working stand. The **mitre saw**/working stand shall not tip over.*

19.7.102 **Mitre saws** shall be provided with means to facilitate the fixing of the machine to a bench, e.g. by providing holes in the base.

Compliance is checked by inspection.

19.8 This subclause of Part 1 is applicable.

19.101 Saw blade guards

19.101.1 To reduce the hazard of incidental contact with the saw blade, the **mitre saw** shall be provided with a combination of an upper **guard** and a lower **guard**.

– The upper **guard** shall cover the **cutting edge zone** and the periphery of the saw blade at least in **quadrants** “A” and “B”. See Figure 103. The upper **guard** shall be fixed with respect to the **saw unit**. To facilitate cutting a workpiece that is taller than the **vertical cutting capacity**, the upper **guard** may incorporate a self-restoring workpiece-activated section with a maximum opening angle of 30° in **quadrant** “A”. When the flange/clamping nut is not circular, it shall be covered by the upper **guard**.

NOTE Additional requirements for the self-restoring workpiece-activated section are specified in 19.101.9 and 19.102. ~~Strength requirements in 20.1 for the upper guard also apply to the workpiece-activated section.~~

– When the **saw unit** is in the **rest position**, the lower **guard** shall be in its saw blade covering position. Unless otherwise specified below, the lower **guard** in this position shall **guard** the **cutting edge zone** and the periphery of a saw blade having a diameter ***D*** in **quadrants** “C” and “D” that is not covered by the upper **guard**. See Figure 103. A maximum of 30° exposure of the **cutting edge zone** and the periphery in **quadrant** “D” is permissible, provided that the entire 30° exposure is located behind the plane of the **fence** workpiece supporting surface when the **saw unit** is in the **rest position**.

The lower **guard** shall be self-restoring and be either:

- “link-activated” complying with the requirements of 19.101.2; or
- “workpiece-activated” complying with the requirements of 19.101.3; or
- “manually actuated” complying with the requirements of 19.101.4.

*Compliance is checked by inspection and by measurement using a (2 ± 0,2) mm thick steel disc of diameter **D** in place of the saw blade.*

19.101.2 For the link-activated **guard**, the movement of the lower **guard** shall be linked with or controlled by the motion of the **saw unit**. The down directed plunging action of the **saw unit**’s motion shall cause the opening stroke of the lower **guard**. However, the lower **guard** shall be free to open further independent of the link, provided this additional movement is self-restoring.

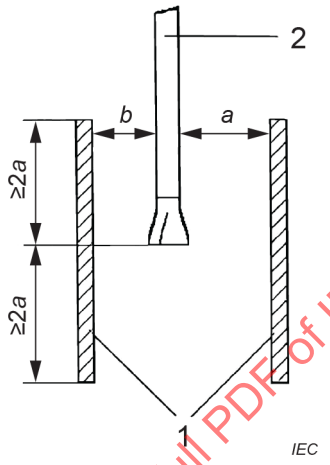
Compliance is checked by inspection.

19.101.3 The workpiece-activated **guard** shall consist at least of two side barriers which, in the **rest position** of the **saw unit**, cover both sides of the saw blade **cutting edge zone** not covered by the upper **guard**. The workpiece-activated **guard** need not cover the periphery of the saw blade. The edge of the side barriers shall extend beyond the periphery of the largest recommended saw blade by at least twice the larger of the two side distances between the plane of the saw blade and the inside surface of the side barrier, see distance ‘*a*’ as

illustrated in Figure 104. During the cutting action, the **guard** barriers shall open when they make contact with the **fence** or the workpiece and shall remain in contact with the **fence** or the workpiece.

The **guard** shall be automatically locked in the saw blade covering position as specified in 19.101.1 when the **saw unit** is in the **rest position**. The locking device shall be designed such that the lower **guard** can be unlocked by either hand of the operator without releasing the grasp on the handle.

*Compliance is checked by inspection, by measurement using a (2 ± 0,2) mm thick steel disc of diameter **D** in place of the saw blade and, for the **guard** locking device, by test 2 of 21.18.2.101.*



Key

a, *b*	distances between the plane of the saw blade and the inside surface of the side barrier
1	side panel
2	saw blade

Figure 104 – Open guard construction

19.101.4 For the manually actuated **guard**, the opening of the **guard** shall be controlled by the same hand that the operator uses to control the **power switch** of the tool. The manual actuation may be used to partially open a **guard** not more than 30° in **quadrant** "C". Further opening of the **guard** may be achieved by a linkage as in a link-activated guard or by contact with the workpiece.

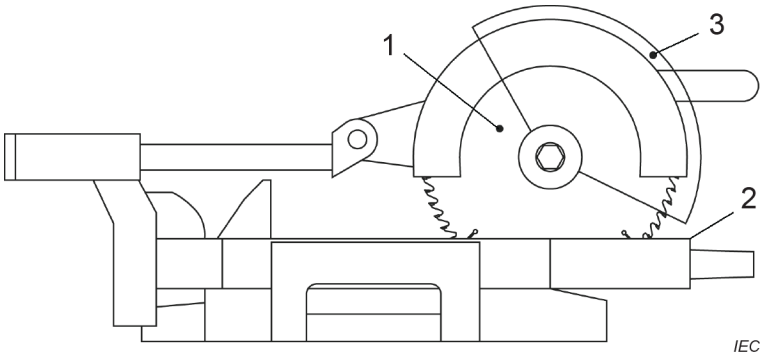
Compliance is checked by inspection and by measurement.

19.101.5 Lower **guards**, with the **saw unit** in the **fully down position**, shall guard against inadvertent contact with the saw blade in the **quadrant** "C".

Compliance is checked by the following test.

*With no workpiece present on the **table top**, the **mitre saw** is set to 0° **bevel angle** and 0° **mitre angle** and the **saw unit** is in the **fully down position**. For manually actuated **guards**, the actuating lever is then released. For **mitre saw** with a sliding function, the **saw unit** is at its maximum extended horizontal position from the **fence**. See Figure 105. A test rod with 12 mm diameter and 50 mm length, with the longitudinal axis of the test probe parallel to the **table top** surface and perpendicular to the cutting line, is applied with a force not exceeding 5 N along any straight line that is parallel with the plane of the **table top** surface and moved towards the **fence**. The test probe is applied with a force not exceeding 5 N and shall not*

*touch the periphery of a (2 ± 0,2) mm thick steel disc of diameter **D** fitted to the **mitre saw** in place of the saw blade.*



Key

1 saw blade

2 table end

3 lower **guard**

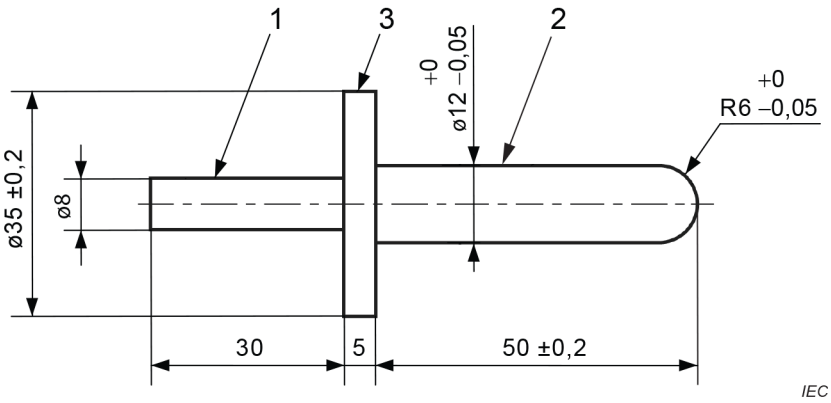
Figure 105 – Position of saw blade and lower guard relative to saw table

19.101.6 The **mitre saw** shall have a provision for the **saw unit** to be locked in a down position to facilitate transportation. In the locked position, the lower **guard** shall ~~cover~~ prevent access to the ~~teeth~~ periphery of the saw blade in the **quadrant** "C".

Compliance is checked by inspection and by the following test applying the test probe of Figure 106.

*For **mitre saws** with a sliding function, the **saw unit** is at its minimum extended horizontal position from the **fence**. Starting from the operators' position the test probe is advanced towards the lower **guard**, spanning the slot in the **kerf plate** with the test section of the test probe, with the axis of the probe being perpendicular to the plane of the saw blade and the flange of the test probe guided on the plane of the **table top**. See Figure 107. The test probe shall not touch the periphery of a (2 ± 0,2) mm thick steel disc of diameter **D** fitted to the **mitre saw** in place of the saw blade.*

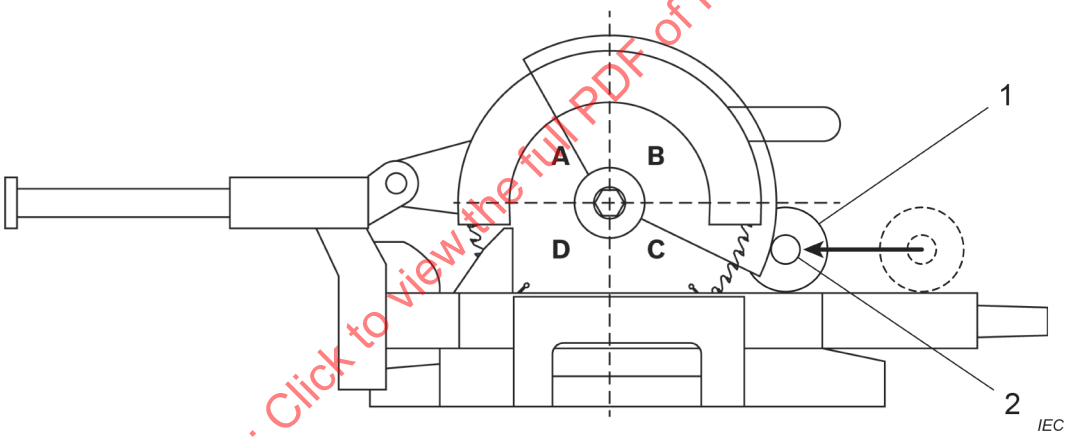
Dimensions in millimetres



Key

1 handle section
2 test section
3 probe's flange

Figure 106 – Test probe



Key

1 test probe flange
2 test section of test probe

Figure 107 – Application of test probe

19.101.7 Mitre saws shall be so constructed that the saw blade cannot be touched from below the **table top**. Any components located below the **kerf plate** that are likely to be cut by the saw blade shall be made of a material (e.g. plastic, aluminium) that can easily be cut by the saw blade. However, the saw blade shall not cut through the structure to the bottom so that the saw blade can be touched from below the **table top**.

Compliance is checked by the following test.

*The **mitre saw** fitted with a saw blade of diameter **D** with a thickness corresponding to the maximum recommended **kerf width** in accordance with 8.14.2 a) 104) is set to 0° **mitre angle** and 0° **bevel angle**. The adjustment of the depth-of-cut in accordance 8.14.2 a) 108) is made to produce the ~~lowest possible~~ **fully down position** of the **saw unit**. The saw is then operated and the **saw unit** moved to the **fully down** ~~to its lowest possible~~ **position**. The saw blade may cut into any component below the **kerf plate**. For saws with a sliding function, the test is conducted with the **saw unit** in any horizontal position.*

*The saw is then switched off and the **saw unit** is moved down to its lowest possible position. The test probe of Figure 106, applied with a force not exceeding 5 N in any possible direction from below the **table top**, shall not touch the periphery of the saw blade. For saws with a sliding function, the test is conducted with the **saw unit** in any horizontal position.*

The test is repeated at

- *one-half the maximum right and left **bevel angle**; and*
- *the maximum right and left **bevel angle**,*

as applicable.

19.101.8 Any openings in the side barriers or in the periphery of the lower **guard**(**s**) shall be designed such as to minimize the ejection of the saw dust towards the operator and be of minimum size to prevent incidental contact with the saw blade.

NOTE Openings in the **guard** are typically provided to enhance the visibility of the saw blade or for the projection of laser line(s).

Compliance is checked by inspection and by the following test.

*The test probe B of IEC 61032 is applied with a force not exceeding 5 N to all openings within the lower **guard** surface area. The test probe shall not make contact with the **cutting edge zone** of a (2 ± 0,2) mm thick steel disc of diameter **D** fitted to the **mitre saw** in place of the saw blade. This test does not apply to the peripheral opening in a workpiece-activated **guard** that has to comply with the dimensional requirement in 19.101.3.*

19.101.9 The closing time of the lower **guard**(**s**) and of a workpiece-activated section in the **quadrant** "A" shall be of a sufficiently short duration to protect against incidental contact of the saw blade.

*Compliance is checked by either test 1, test 2 or test 3, as applicable, and conducted just prior to the endurance test of the return devices of 19.102. During the test, the **mitre saw** is set to 0° **bevel angle** and to 0° **mitre angle**. Test 1 applies to workpiece-activated lower **guards** and manually actuated lower **guards**. Test 2 applies to link-activated lower **guards**. Test 3 applies to workpiece-activated sections in the **quadrant** "A".*

1) *The closing time of the **guard** in seconds from the fully open position to the saw blade covering position, as specified in 19.101.1, shall be less than the numerical equivalent of **D** expressed in metres.*

   *The fully open position of the **guard** is the position normally achieved by the movement of the **saw unit** to its **fully down position** and by the additional displacement of the **guard** as a result of cutting a workpiece with a thickness equal to the **vertical cutting capacity**.*

   *During the measurement, however, the **saw unit** is at **rest position**. The workpiece-activated lower **guard** locking device and the manual **guard** actuating device are appropriately operated to allow the **guards** to fully open.*

2) *The **saw unit** is moved to its **fully down position** and the lower **guard** is opened to a position that is equivalent to cutting a workpiece with a thickness equal to the maximum **vertical cutting capacity**. The lower **guard** closing time from this open position to the saw blade covering position corresponding to the **saw unit** being at the **fully down position** shall be less than 0,2 s.*

3) *A workpiece-activated section in the **quadrant** "A" is opened to its maximum position and then allowed to close. The closing time from the open position to the saw blade covering position as specified for the **quadrant** "A" in 19.101.1 shall be less than 0,2 s.*

19.102 Return devices

The return device of the **saw unit**, the lower **guard** and of the workpiece-activated section in the **quadrant** "A" shall have sufficient durability. In addition, the return device shall move the **saw unit** from the **fully down position** to the **rest position** within a reasonably short time.

Compliance is checked by the following test and by measurement.

*The **mitre saw** fitted with a (2 ± 0,2) mm thick steel disc of diameter **D** in place of the saw blade is set to 0° **bevel angle** and 0° **mitre angle** settings and the **saw unit** is in the **rest position**. The **saw unit** is lowered from the **rest position** with no sliding action, if any, to the **fully down position**, then released. The time to return to the **rest position**, including the lower **guard** protection as required in 19.101.2, 19.101.3 or 19.101.4, as applicable, shall not exceed 1 s.*

*For the endurance test, the **saw unit** is moved to its **fully down position** with a time period of at least 1 s and allowed to return to its **rest position** with a time period of at least 3 s, i.e. the return movement is deliberately slowed down to reflect typical use. This down and up movement of the **saw unit** is repeated for 50 000 cycles.*

*The **mitre saw** under this test may be set up such, if possible or desired, that concurrently with the **saw unit** return device durability test, the lower **guard** is also made to be cycled from fully open, as defined by 19.101.9, to the saw blade covering position as specified in 19.101.1. If the lower **guard** cycling durability is not conducted concurrently with the **saw unit** return device durability, then the lower **guard** durability shall be conducted separately for 50 000 cycles. If the lower **guard** is tested separately from the **saw unit** return device durability, the opening action of each cycle is conducted with a time period of at least 1 s and the closing action with a time period of at least 3 s.*

*The workpiece-activated section in the **quadrant** "A", if applicable, shall be cycled for 5 000 cycles.*

After the conclusion of the return devices endurance tests:

- *the return time of the **saw unit** from the **fully down position** to a position where the lower **guard** protection is as required in 19.101.2, 19.101.3 or 19.101.4, as applicable, shall not exceed 2 s;*
- *the closing time of the lower **guards** and of a workpiece-activated section in the **quadrant** "A" shall be less than 140 % of the requirements set by 19.101.9;*
- *the **saw unit** shall automatically return when released from approximately 25 %, 50 % and 75 % of the **fully down position** such that the degree of the lower **guard** protection is as required in 19.101.2, 19.101.3 or 19.101.4, as applicable.*

19.103 Run-down time

The run down time of the saw blade shall not exceed 10 s after switching off the motor. Device(s), if any, to achieve the 10 s run-down time shall not be applied directly to the saw blade or to the saw blade driving flanges.

Compliance is checked by inspection and by the following test, which is performed ten times.

*A steel test disc with a thickness of (2 ± 0,1) mm and a diameter **D** is mounted to the tool. The tool motor is switched on for a minimum of 30 s, then switched off. The run-down time is measured. For each test, the run-down time shall not exceed 10 s.*

20 Mechanical strength

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

20.1 *Addition:*

~~Guards~~ The upper **guard** and lower **guard** for the saw blade as specified in 19.101.1 shall be manufactured from any of the following:

a) metal having the following characteristics:

Ultimate tensile strength N/mm^2	**Minimum thickness** mm
≥ 380	1,25
≥ 350 and < 380	1,50
≥ 200 and < 350	2,00
≥ 160 and < 200	2,50

b) polycarbonate with a wall thickness of at least 3 mm;

c) other non-metallic material ~~having an impact strength equal to or better than polycarbonate~~ of at least 3 mm thickness with an ultimate tensile strength of at least 60 N/mm^2 and an Izod notched impact strength of at least 60 kJ/m^2 in accordance with ISO 180.

Compliance is checked by inspection, by measurement and by either receipt of confirmation of the ultimate strength of the material from the material manufacturer or through measurement of samples of the material.

~~NOTE The notched Izod impact test per ISO 180 is a typical method of evaluating impact strength on non-metallic materials.~~

20.5 This subclause of Part 1 is not applicable.

20.101 Means for transportation of the **mitre saw** as required by 19.4 and as described in the instructions in accordance with 8.14.2 b) 107) shall be of adequate strength to safely transport the machine.

Compliance is checked by inspection and by the following test.

Carrying means are subjected to a force corresponding to three times the weight of the equipment but not more than 600 N per carrying means. The force is applied in the direction of lifting uniformly over a 70 mm width at the centre of the carrying means. The force is steadily increased so that the test value is attained within 10 s and maintained for a period of 1 min.

If more than one carrying means is provided or if a portion of the weight is distributed over a wheel, the force is distributed between the carrying means in the same proportion as in the normal transportation position. If the equipment is provided with more than one carrying means, but so designed that it may readily be carried by only one carrying means, each carrying means shall be capable of sustaining the total force.

The carrying means shall not break loose from the equipment and there shall not be any permanent distortion, cracking or other evidence of failure.

20.102 A working stand for a **mitre saw**, if provided with the tool or if specifically identified in accordance with 8.14.2, shall have adequate strength.

Compliance is checked by the following test.

*The **mitre saw** is mounted to the working stand and an additional vertical force of 3**D** is gradually applied for 1 min, distributed equally on the **table top** of the **mitre saw**. During the*

test, the working stand shall not collapse, and after removing the force, it shall not show any permanent deformation.

NOTE Equal distribution of the additional force can be achieved by using bags of sand or other similar means.

21 Construction

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

21.18.2 *Replacement:*

Mitre saws shall be fitted with a **momentary** ~~contact~~ **power switch** which can be switched on and off by either hand of the user from the operator's position as specified in accordance with 8.14.2, without releasing the grasp of the **saw unit's** handle. The actuation of the **power switch** shall not be affected or restricted by the position of the **turn table** or by the workpiece.

Compliance is checked by inspection.

21.18.2.1 This subclause of Part 1 is not applicable.

21.18.2.2 This subclause of Part 1 is not applicable.

21.18.2.3 This subclause of Part 1 is not applicable.

21.18.2.4 This subclause of Part 1 is not applicable.

21.18.2.101 In order to reduce the risk associated with starting an unintentional cutting action, the **mitre saw** shall meet the requirement of either a), b) or c).

a) The **power switch** shall be provided with a lock-off device with an actuation means that is independent of the actuation means of the **power switch** and that can be operated by either hand of the user. If the actuations of the lock-off device and of the **power switch** are operated in the same direction, then the lock-off actuation shall be operated prior to the actuation of the **power switch**.

b) The **saw unit** of a **mitre saw** shall be automatically locked when the **saw unit** is in its uppermost position. The locking device shall be designed such that the **saw unit** can be unlocked by either hand of the operator without releasing the grasp on the handle.

c) The lower **guard** of a **mitre saw** shall be automatically locked when the lower **guard** is in its saw blade covering position as specified in 19.101.1. The locking device shall be designed such that the lower **guard** can be unlocked by either hand of the operator without releasing the grasp on the handle.

Compliance with a) is checked by inspection.

NOTE Lock-off devices for **power switches** are also subject to the durability requirements of 21.17.1.

Compliance with b) is checked by the following test.

*The **saw unit** fitted with a (2 ± 0,2) mm thick steel disc of diameter **D** in place of the saw blade is in the **rest position** at 0° **bevel angle** and 0° **mitre angle** setting. The operating handle of the **saw unit** at the highest point is subjected to a load of 150 N vertically downwards. The minimum distance between the steel disc periphery and the **table top**, before and after applying the load, shall not be diminished by more than 15 mm.*

*Compliance with c) is checked by test 1 for the link-activated and manually-actuated **guards** and test 2 for workpiece-activated **guards**.*

1) *The **saw unit** is in the **rest position** at 0° **bevel angle** and 0° **mitre angle** setting. The lower **guard** is subjected to a load of 50 N in the direction of opening activation at the location that is most likely to defeat the integrity of the locking system and to activate the opening of the **guard**. The lower **guard** in **quadrant** "D" shall not expose the periphery of the steel disc by more than 5° from a saw blade exposure existing in the **rest position**.*

2) *The **saw unit** at 0° **bevel angle** and 0° **mitre angle** setting is moved such that the locked lower **guard** contacts the **table top**. The operating handle of the **saw unit** at the highest point is subjected to a load of 150 N vertically downwards. The bottom edge of the side barriers shall not come closer to the steel disc rim than the larger of the two side distances between the plane of the steel disc and the inside surface of the side barrier.*

*After the conclusion of the tests for b) and c), the lower **guard** shall remain in compliance with the requirements of 19.101.*

21.30 This subclause of Part 1 is not applicable.

21.35 This subclause of Part 1 is applicable.

21.101 Construction to facilitate cutting tool installations

21.101.1 The **mitre saw** guarding system shall allow changing of the saw blade without removing the lower **guard** from the machine.

Compliance is checked by inspection.

21.101.2 Mitre saws shall be provided with a saw blade. The **mitre saw** shall be constructed so that saw blades with diameters larger than intended for the saw cannot be mounted.

*Compliance is checked by inspection and by the following test. It shall not be possible to freely mount a (2 ± 0,2) mm thick steel disc with a diameter 12 mm or 3 % larger than **D**, whichever is larger.*

21.102 Table top

21.102.1 The **table top** shall be so designed that it extends in a direction parallel with the **fence** on each side of the saw blade to provide for an adequate workpiece securing zone and have a sufficient dimension perpendicular to the plane of the **fence**, for the stability of the workpiece. If workpiece support extension(s) are used to comply with the above requirement, they shall not be removable without the aid of a tool. If they are adjustable, they shall be capable of being fixed during operation. The **table top** surfaces need not be continuous.

Compliance is checked by inspection and by the following test.

~~*Perpendicular to the **fence**, the workpiece support provided by the **table top** shall have a dimension of at least the following percentage of the **horizontal cutting capacity** at the **mitre angle** setting corresponding to the relevant mitre side of the saw blade:*~~

~~– *80 % for a simple pivoting arm **mitre saw**;*~~

~~– *50 % for a **mitre saw** with a sliding function.*~~

~~NOTE Some **mitre saw** designs have different maximum **mitre angles** on the left and right mitre side, leading to different minimum table dimensions on either mitre side.~~

~~*For the following test,*~~ *The saw blade is set to the maximum **mitre angle** at 0° **bevel angle**. The **saw unit** is at its **fully down position** and for a **mitre saw** with a sliding function, the **saw unit** is at its maximum extended horizontal position from the **fence**. The **mitre saw** is fitted with a (2 ± 0,2) mm thick steel disc of diameter **D** in place of the saw blade.* ~~*Parallel to the **fence**, the workpiece support of the **table top** shall extend at least 100 mm beyond the*~~

~~*perpendicular projection onto the **fence** of the intersect point of the steel disc periphery in **quadrant** "C" with the plane of the **table top**. See Figure 106.*~~

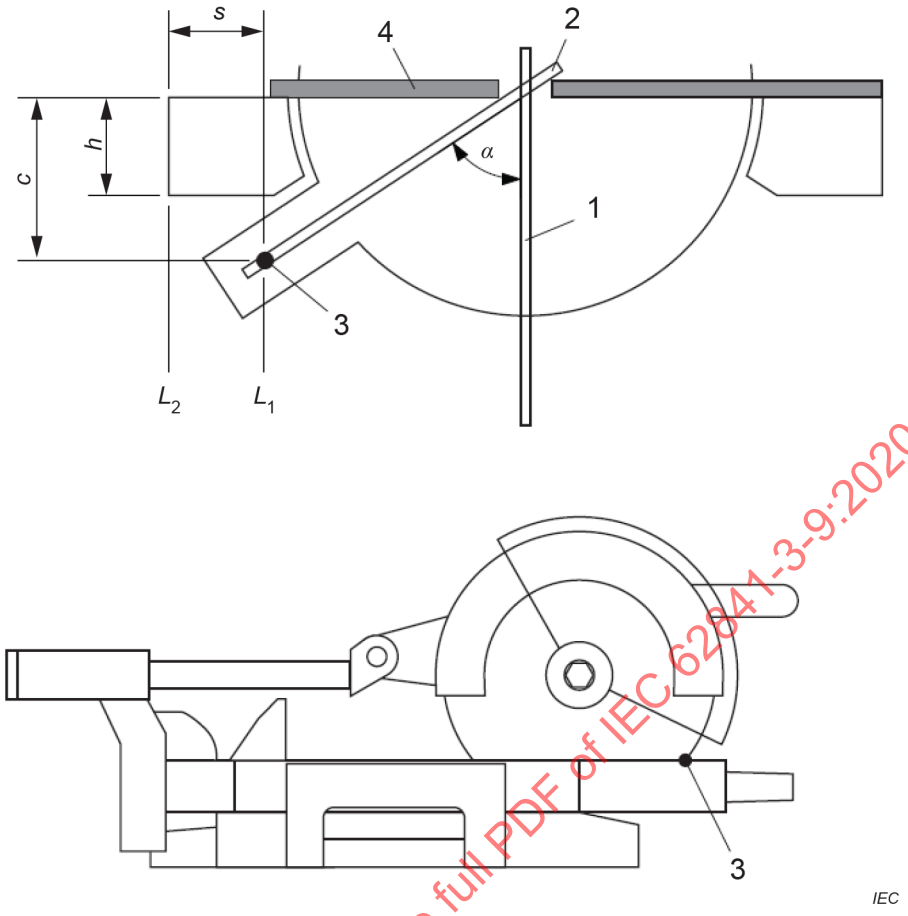
*A line L_1 is established that is the perpendicular projection onto the plane of the **fence** of the intersect point (key item 3 in Figure 108) of the steel disc periphery in **quadrant** "C" with the plane of the **table top**.*

*The measurement of the total amount of support (dimension "h" in Figure 108) along a line L_2 parallel to L_1 at least 100 mm (dimension "s" in Figure 108) measured from the plane of the **fence** shall be at least*

- *80 % of dimension "C" in Figure 108 for a simple pivoting arm **mitre saw**; or*
- *50 % of dimension "C" in Figure 108 for a **mitre saw** with a sliding function.*

*If applicable, the test is then repeated with the **saw unit** set to the maximum **mitre angle** at 0° **bevel angle** on the opposite side of the **mitre saw**.*

NOTE Some **mitre saw** designs have different maximum **mitre angles** on the left and right mitre side, leading to different minimum table dimensions on either mitre side.



Key

α maximum **mitre angle** (left mitre side shown)

s minimum workpiece support parallel to the **fence**

h minimum workpiece support perpendicular to the **fence**

C **horizontal cutting capacity** at maximum **mitre angle**

1 steel disc at 0° **bevel angle** and 0° **mitre angle**

2 steel disc at 0° **bevel angle** and maximum **mitre angle**

3 steel disc and table top intersect point at 0° **bevel angle** and maximum **mitre angle**

4 **fence**

Figure 108 – Workpiece support dimensions

21.102.2 The horizontal planes of the **turn table** and of the fixed part of the table base shall not be vertically offset from the plane defined by the **kerf plate** by more than ± 1,0 mm. The table base and the **turn table** surfaces need not be continuous.

Compliance is checked by inspection and by measurement.

21.102.3 The **mitre saw** shall be provided with a **kerf plate**. But for the slot in the **kerf plate**, to accommodate the saw blade, the **kerf plate** surface shall be continuous. The slot in the **kerf plate** for the saw blade shall be no more than 12 mm wide. The **kerf plate** may be interchangeable in accordance with 8.14.2 b) 105), provided the change requires the use of a tool. The **kerf plate** shall be made of a material that can easily be cut, e.g. plastic, wood or aluminium.

Compliance is checked by inspection and by measurement.

21.103 Table fence

21.103.1 A **fence** shall be provided on each side of the saw blade and shall be of an adequate length to provide support of the workpiece. The **fence** shall have a minimum height of 0,6 times **vertical cutting capacity** at 0° **bevel angle** setting except ~~for the portion~~ that portions of the **fence**(s) ~~adjacent to the cutting line shall~~ may be either adjustable or profiled as necessary to allow the saw blade, flange, **guard** and motor housing, as applicable, to pass under all cutting conditions. The face of the **fence** need not be continuous.

Compliance is checked by inspection and by measurement.

On each side of the saw blade, the **fence** shall extend at least the greater of:

– ¾ ***D***; or

– the perpendicular distance *E* from the plane of the steel disc at 0° **bevel angle** and 0° **mitre angle** to the intersect point (key item 3 in Figure 109) of the steel disc periphery in **quadrant** "C" in its **fully down position** with the plane of the **table top** at 0° **bevel angle** and the maximum **mitre angle** on that side of the saw blade. See Figure 109.

At 0° **mitre angle** and 0° **bevel angle**, the gap measured in the front plane of the **fences** and parallel to the **table top** (see Figure 110), between the closest point of the adjustable or profiled **fence** on each side and the surface of a (2 ± 0,2) mm steel disc of diameter ***D*** mounted in place of the saw blade to the **mitre saw** shall not exceed:

– 20 mm, for designs with a **centre workpiece support**;

– 8 mm, for all other saws.

Compliance is checked by measurement.

The part of the **fence** adjacent to the saw blade shall be made from material ~~such as~~ that can easily be cut by the saw blade, e.g. aluminium, plastic or wood.

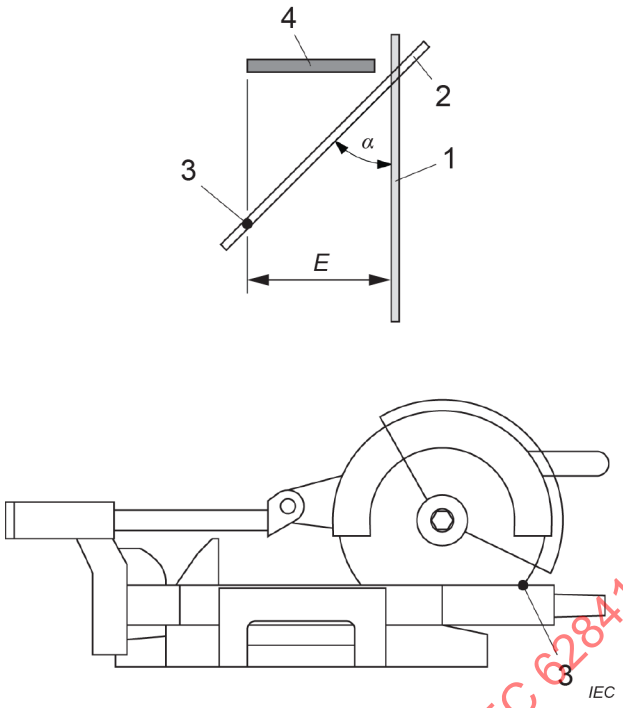
Compliance is checked by inspection.

The vertical planes of the **fence** faces on either side of the steel disc including the face of the **centre workpiece support**, if any, shall be sufficiently aligned to minimize the likelihood of displacement of the workpiece during the cut.

Compliance is checked by the following test.

*The saw is set to 0° **mitre angle** and 0° **bevel angle**. The **fence** is set to produce the minimum gap between the steel disc and the **fence** faces. If applicable, the **fence** is adjusted in accordance with 8.14.2 a) 109). A straight edge with sufficient length to span the entire **fence** is held against the **fence** at a height of (25 ± 2) mm above and parallel to the **table top** such that there is at least one point of contact on the **fence** face at either side of the steel disc. The gap between the straight edge and the **fence** or any **centre workpiece support** at any point shall not exceed 2 mm. The **centre workpiece support**, if any, shall not protrude beyond the line of the straight edge.*

*If provided, the test is repeated for **fences** with multiple sections with the straight edge parallel to the **table top** at a height corresponding to the centre of the additional section(s). If there is no corresponding **fence** face on the opposite side of a multiple section, a measurement is not required for that section.*



Key

α maximum **mitre angle** (left mitre side shown)

E minimum extension of the **fence** (see 21.103)

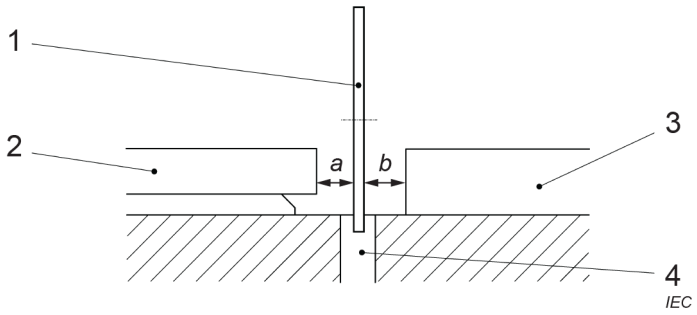
1 steel disc at 0° **bevel angle** and 0° **mitre angle**

2 steel disc at 0° **bevel angle** and maximum **mitre angle**

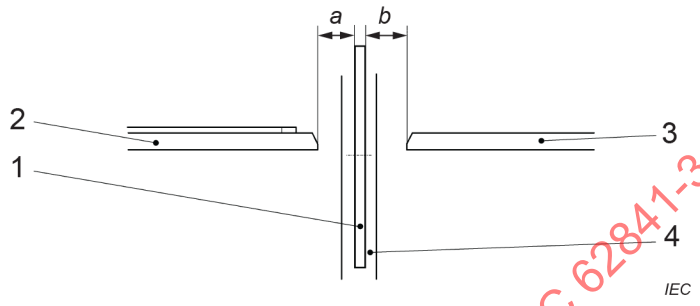
3 intersect point of the steel disc periphery in **quadrant** "C" at its **fully down position** with the plane of the **table top** at 0° **bevel angle** and the maximum **mitre angle**

4 **fence**

Figure 109 – Minimum extension of fence



a) Front view



b) Top view

Key

a, b	gap between the **fence** and the steel disc
1	steel disc
2	adjustable part of a **fence**
3	fixed **fence**
4	slot in the table/**kerf plate**

Figure 110 – Distance between fence and saw blade

21.103.2 Centre workpiece support

If a **centre workpiece support** is provided, as illustrated in Figure 101, it shall not interfere with any cutting operation and shall be made of a material that can be easily cut, e.g. aluminium, plastic or wood. The **centre workpiece support** shall have a minimum height of 0,35 times the **vertical cutting capacity** at 0° **bevel angle** setting, measured from the plane defined by the **kerf plate**. The total face width of the **centre workpiece support** shall be at least 6 mm including the slot, except for portions of the face that have to be profiled as necessary to be set for any cutting operation. The ~~**kerf**~~ slot of the **centre workpiece support** shall align with the plane of the saw blade for any **bevel angle** or **mitre angle** setting. The **centre workpiece support** shall be capable of adjustment such that there is at least one point of support aligned with the plane of the **fence** and that no other point extends in front of the plane of the **fence**. This may be achieved by automatic or manual adjustment.

Compliance is checked by inspection and by measurement.

21.104 ~~Mitre saws~~ Workpiece clamp

21.104.1 M**itre saws** shall be provided with at least one workpiece clamping device.

Compliance is checked by inspection.

21.104.2 The **table top** of the **mitre saw** shall be designed for the workpiece clamp(s) to be used at least for a vertical clamping on either side of the saw blade.

Compliance is checked by inspection and by manual test.

21.105 Spindle and flanges

21.105.1 The **mitre saw** spindle shall have a diameter for mounting the saw blade not less than 12 mm for a saw blade having a diameter ***D*** less than or equal to 255 mm and not less than 15 mm for a saw blade having a diameter of greater than 255 mm. The ultimate tensile strength for the spindle shall be a minimum of 350 N/mm².

Compliance is checked by inspection, by measurement and by either receipt of confirmation of the ultimate tensile strength of the material from the material manufacturer or through measurement of samples of the material.

21.105.2 The **mitre saw** spindle shall have a rotation that advances the saw blade tips from **quadrant** "A" to **quadrant** "B" and so on. The spindle shall have a provision to be keyed to the outer saw blade flange or it shall otherwise prevent the rotation of the flange with respect to the spindle.

Compliance is checked by inspection.

21.105.3 In order to limit vibration due to unbalance of the saw blade, the total possible eccentricity of the parts locating the saw blade shall be limited.

Compliance is checked by measurement. The eccentricity, measured as the difference between the maximum and minimum reading of the indicator, shall be less than 0,2 mm.

21.105.4 The saw blade retaining fastener(s) in conjunction with the spindle shall not loosen under any operations, such as saw blade acceleration during start-up and rapid saw blade deceleration induced by motor braking devices, if any.

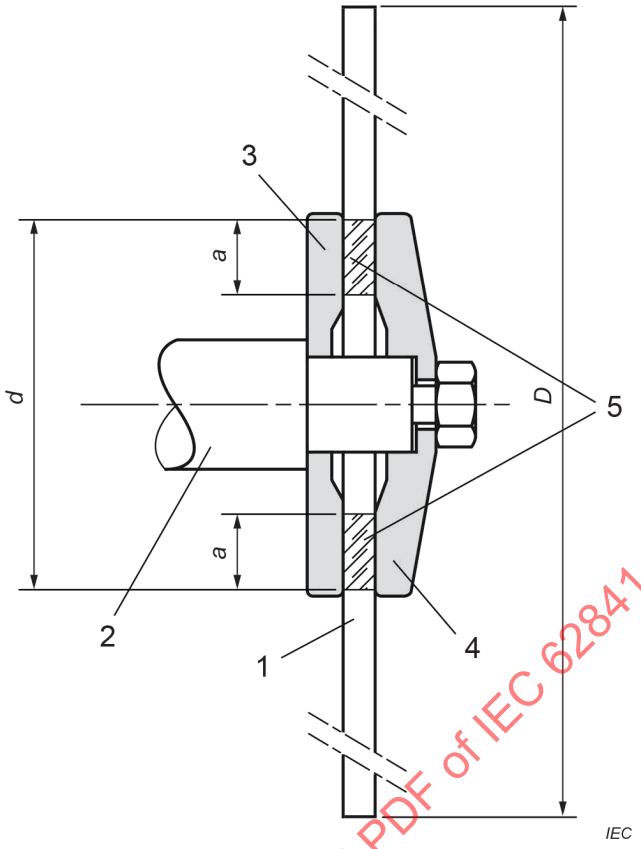
Compliance is checked by the following ~~manual~~ test.

*A (2 ± 0,2) mm steel disc of diameter **D** is mounted to the **mitre saw**. The **mitre saw** is started from the **rest position**, allowed to reach operating speed and shut down. This cycle is repeated ten times. The saw blade shall not become loose during and at the conclusion of the test.*

21.105.5 The saw blade supporting flanges, as illustrated in Figure 111, shall:

– have an outer diameter of the clamping surface overlap of the flanges of at least ***D***/6;
– be keyed by the outer flange to the spindle or otherwise prevented from rotation with respect to the spindle;
– have a clamping surface overlap *a* of the inner and outer flange of at least 0,1 times the diameter of the smaller flange.

Compliance is checked by inspection and by measurement.



Key

a clamping surface overlap
D maximum specified saw blade diameter
d outer diameter of the clamping surface overlap
1 saw blade
2 output spindle
3 inner flange
4 outer flange
5 clamping surface overlap area

Figure 111 – Flange characteristics

22 Internal wiring

This clause of Part 1 is applicable.

23 Components

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

23.3 This subclause of Part 1 is not applicable.

24 Supply connection and external flexible ~~cables and~~ cords

This clause of Part 1 is applicable.

25 Terminals for external conductors

This clause of Part 1 is applicable.

26 Provision for earthing

This clause of Part 1 is applicable.

27 Screws and connections

This clause of Part 1 is applicable.

28 Creepage distances, clearances and distances through insulation

This clause of Part 1 is applicable.

Annexes

The annexes of Part 1 are applicable, except as follows:

Annex I
(informative)

Measurement of noise and vibration emissions

NOTE In Europe (EN ~~62841-3-1~~ 62841-3-9), Annex I is normative.

I.2 Noise test code (grade 2)

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

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

~~*Modification*~~ *Addition:*

Saws supplied with a working stand are placed on this working stand standing on a reflecting plane.

Other saws are placed on a test bench as shown in Figure I.1 standing on a reflecting plane.

I.2.5 Operating conditions

Addition:

Mitre saws are tested under load under the conditions shown in Table I.101.

Table I.101 – Noise test conditions for mitre saws

Material	Beech – 20 mm × 2/3 **horizontal cutting capacity**, but not more than 200 mm – planed on four sides
Feed force	Just sufficient to cut at a brisk pace without overloading the machine
Width of cut-off	15 mm minimum at 0° **mitre angle** and 0° **bevel angle**
Test cycle	Five cuts quickly following each other constitutes one complete test cycle. The measurement is conducted (averaged) over the complete test cycle
Tool bit	New saw blade, tungsten carbide tipped for crosscutting and having the maximum specified blade diameter ***D***, to be used for the entire series of tests

I.3 Vibration

This clause of Part 1 is not applicable.

Annex K
(normative)

Battery tools and battery packs

~~**K.1** *Addition:*~~

All clauses of the main body of this Part 3-9 apply unless otherwise specified in this annex. If a clause is stated in this annex, its requirements replace the requirements of the main body of this Part 3-9 unless otherwise specified.

K.21.18.2.101 *Modification:*

Items b) and c) are not applicable.

Annex L
(normative)

Battery tools and battery packs provided with mains connection or non-isolated sources

~~L.1 *Addition:*~~

All clauses of the main body of this Part 3-9 apply unless otherwise specified in this annex. If a clause is stated in this annex, its requirements replace the requirements of the main body of this Part 3-9 unless otherwise specified.

L.21.18.2.101 *Modification:*

Items b) and c) are not applicable.

Bibliography

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

Addition:

IEC 62841-3-10, *Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety – Part 3-10: Particular requirements for transportable cut-off machines*[1]

~~IEC 62841-3-11, *Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety – Part 3-11: Particular requirements for transportable combined mitre and table saws*[1]~~

~~[1] Under consideration.~~

IEC 62841-3-9

Edition 2.0 2020-02

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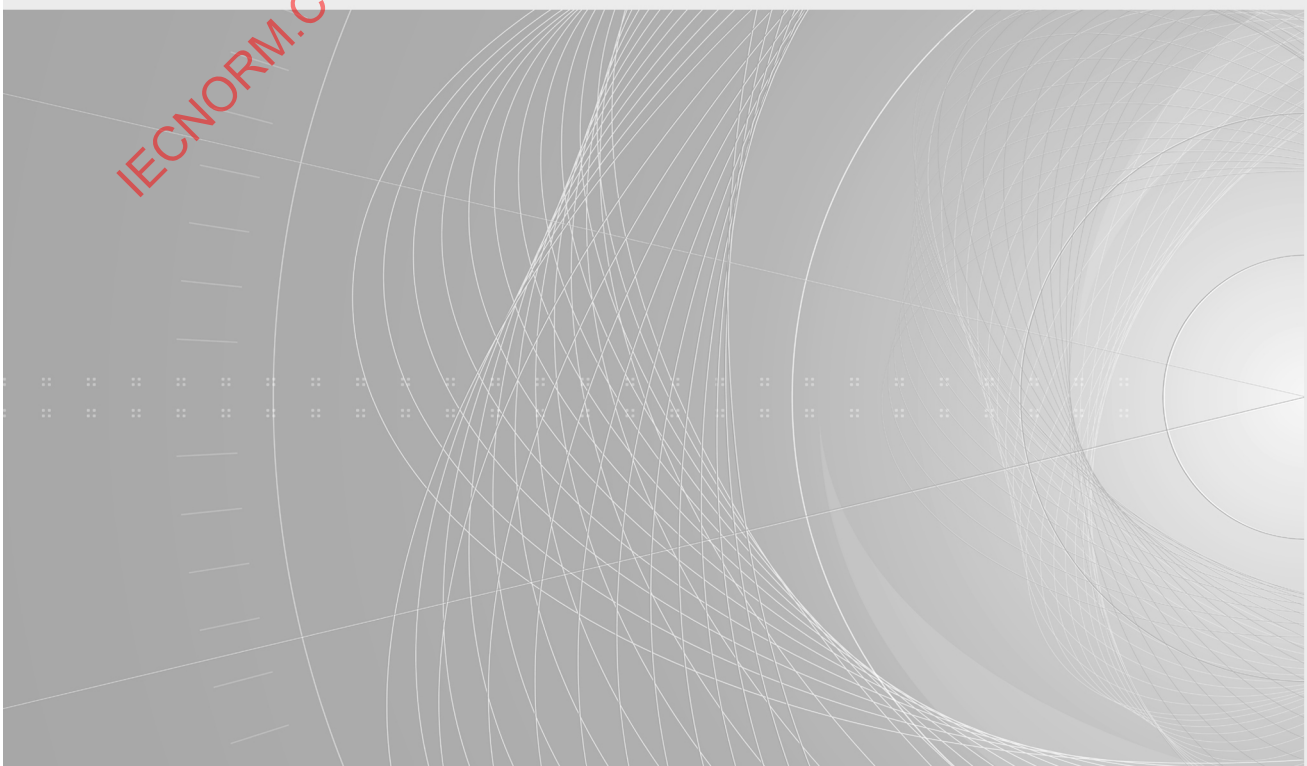
Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety – Part 3-9: Particular requirements for transportable mitre saws

Outils électroportatifs a moteur, outils portables et machines pour jardins et pelouses – Sécurité – Partie 3-9: Exigences particulières pour les scies à onglets transportables



IEC 62841-3-9:2020-02(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 3-9: Particular requirements for transportable mitre saws

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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International Standard IEC 62841-3-9 has been prepared by IEC technical committee 116: Safety of motor-operated electric tools.

This second edition cancels and replaces the first edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Clause 1: Scope: increase of the maximum saw blade diameter to 410 mm;
b) Corrigendum 1 and Corrigendum 2 of the first edition have been incorporated in this second edition.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
116/430/FDIS	116/442/RVD

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

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

This Part 3-9 is to be used in conjunction with the IEC 62841-1:2014.

This Part 3-9 supplements or modifies the corresponding clauses in IEC 62841-1, so as to convert it into the IEC Standard: Particular requirements for transportable mitre saws.

Where a particular subclause of Part 1 is not mentioned in this Part 3-9, that subclause applies as far as reasonable. Where this standard states “addition”, “modification” or “replacement”, the relevant text in Part 1 is to be adapted accordingly.

The following print types are used:

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

The terms defined in Clause 3 are printed in **bold typeface**.

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

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 publication 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.

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 publication 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 3-9: Particular requirements for transportable mitre saws

1 Scope

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

Addition:

This part of IEC 62841 applies to transportable **mitre saws** intended to be used with a toothed saw blade for cutting wood and analogous materials, plastics and nonferrous metals except magnesium with a saw blade diameter not exceeding 410 mm, which hereinafter might simply be referred to as saw or tool.

This International Standard does not apply to **mitre saws** intended to cut other metals, such as magnesium, steel and iron. This document does not apply to **mitre saws** with an automatic feeding device.

NOTE 101 Transportable saws intended to cut ferrous metals will be covered by a future part of IEC 62841-3.

This document does not apply to saws designed for use with abrasive wheels.

NOTE 102 **Transportable tools** designed for use with abrasive wheels are covered by IEC 62841-3-10.

This document does not apply to tools combining the function of a **mitre saw** with the function of a table saw.

NOTE 103 **Transportable tools** combining the function of a **mitre saw** with the function of a table saw are covered by a future part of IEC 62841-3.

2 Normative references

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

Addition:

ISO 180, *Plastics – Determination of Izod impact strength*

3 Terms and definitions

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

3.101
bevel angle
angular displacement of the saw blade plane with respect to the **table top** plane, the position of the saw blade plane that is perpendicular to the **table top** being the 0° bevel position

3.102
compound angle
angular displacement of the saw blade plane having a **bevel** and **mitre angle** other than 0°

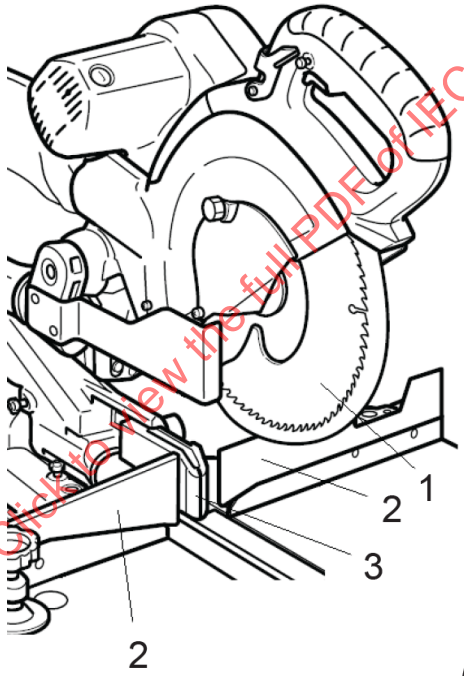
3.103
cutting edge zone
outer 20 % of the radius of the saw blade

3.104
D
specified diameter of the saw blade

3.105
fence
device to position the workpiece and absorb the horizontal forces from the saw blade during the cutting process

3.105.1
centre workpiece support
device that has a face supporting the workpiece in conjunction with the **fence**

Note 1 to entry: See Figure 101.



Key

1 saw blade
2 **fences**
3 **centre workpiece support**

Figure 101 – Mitre saw with centre workpiece support

3.106
fully down position
position of the **saw unit** after adjustment of the saw in accordance with 8.14.2 a) 107) and any depth-of-cut stop as in 8.14.2 a) 108) disengaged or adjusted in order to produce the lowest position of the **saw unit**

3.107
horizontal cutting capacity
largest dimension perpendicular from the plane of the **fence** (width) of a workpiece with rectangular cross section that can be completely cut through with a single pass of the saw blade

Note 1 to entry: Subclause 5.101 provides a measurement procedure for **horizontal cutting capacity**.

3.108
kerf width
distance between two parallel planes that are touching the opposing sides of at least three saw blade tooth tips

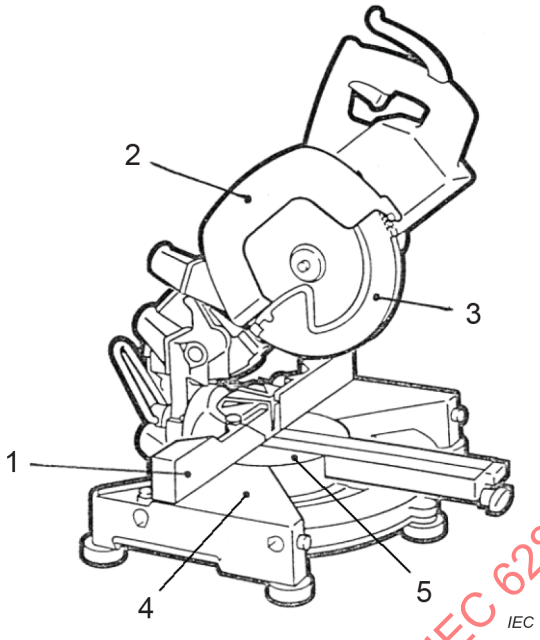
3.109
kerf plate
portion of the **table top** on both sides of the saw blade intersect line with the **table top** for the purpose of minimizing the tearing of the wood fibres by the saw blade

Note 1 to entry: Depending on the design, the **kerf plate** is adjustable, replaceable or an integral part of the **table top**.

3.110
mitre angle
angular displacement of the plane of the **fence** with respect to the cutting line, the position of the saw blade plane that is perpendicular to the plane of the **fence** being the 0° mitre position

3.111
mitre saw
saw consisting of a **table top** and a **fence** which support and position the workpiece, and a **saw unit**, projecting over the **table top**

Note 1 to entry: Cutting is achieved by moving the **saw unit** through a plunging action or a combination of plunging and sliding actions. The workpiece does not move with respect to the **table top** or **fence** during cutting. The **saw unit** can be adjustable to cut at a **bevel angle**, a **mitre angle** or both angles to create a **compound angle** cut. See Figure 102.



Key

1 **fence**

2 upper **guard**

3 lower **guard**

4 table base

5 **turn table**

Figure 102 – Mitre saw

3.112
quadrants
with the **saw unit** in the **fully down position**, parts of the saw blade defined by two lines intersecting the centre of the saw blade, where one line is parallel to the **table top** and the other line is perpendicular to the first line

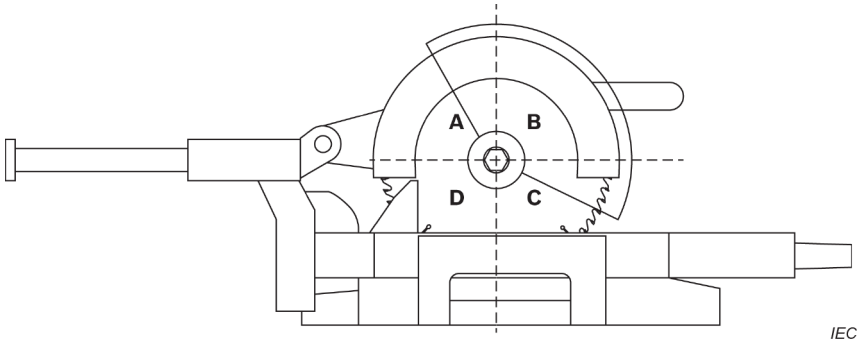
Note 1 to entry: The **quadrants** remain fixed in relation to the **saw unit** as it moves between the **rest position** and the **fully down position** (see Figure 103):

– **quadrant** "A" is above the line parallel to the **table top** and away from the operator's position;

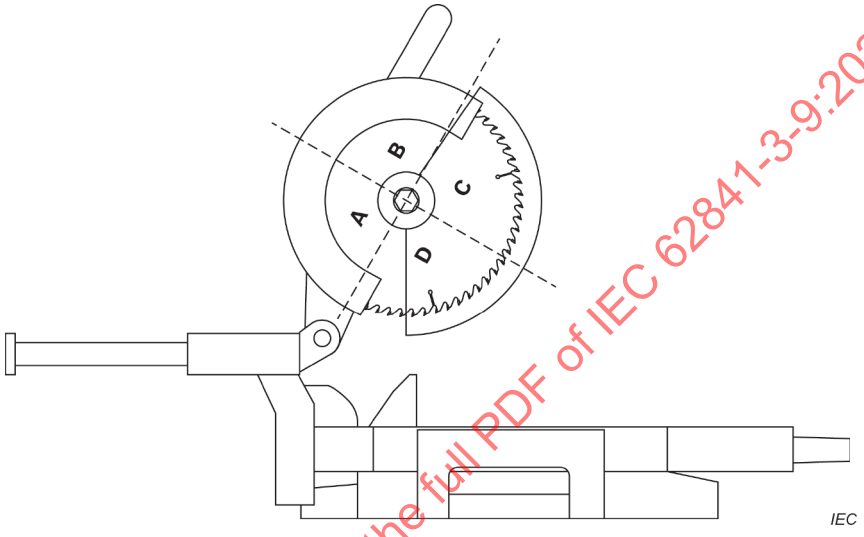
– **quadrant** "B" is above the line parallel to the **table top** and closer to the operator's position;

– **quadrant** "C" is below the line parallel to the **table top** and closer to the operator's position;

– **quadrant** "D" is below the line parallel to the **table top** and away from the operator's position.



a) Saw unit in fully down position



b) Saw unit in rest position

Figure 103 – Saw blade quadrants

3.113
rest position
position of a **saw unit** in its uppermost position from the **table top** and, for **mitre saws** with a sliding action, at the maximum sliding position towards the **fence**

3.114
saw unit
device with an affixed saw blade, capable of performing a cutting action

3.115
table top
horizontal surface that is in contact with and supports the workpiece and typically consists of a **turn table,** a table base on each side of the **turn table** and workpiece support extension(s)

Note 1 to entry: See Figure 102.

3.116
turn table
workpiece supporting device that facilitates the **mitre angle** adjustment

3.117
vertical cutting capacity
largest height dimension above the **table top** (thickness) of a workpiece with rectangular cross section having a width dimension equal to the **horizontal cutting capacity**, that can be completely cut through with a single pass of the saw blade

4 General requirements

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

4.101 Throughout the remaining part of this document, unless otherwise explicitly stated, whenever a requirement or a reference is made to

– "saw blade":

  this shall equally apply to any "saw blade" as specified in accordance with 8.14.2 a);

– "force" as a multiple of ***D***:

  the force shall be expressed in newtons (N) and the saw blade diameter ***D*** shall be expressed in millimetres (mm).

5 General conditions for the tests

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

5.17 *Addition:*

The mass of the tool shall include the ***fences*** *and required workpiece clamp(s) in accordance with 21.103 and 21.104. Further parts such as carrying means that are required in accordance with the instructions for the safe use of the tool shall be included in the mass.*

5.101 Procedure to determine the horizontal cutting capacity

The ***mitre saw*** *is fitted with a (2 ± 0,2) mm thick steel disc of diameter* ***D*** *in place of the saw blade and is set to 0°* ***bevel angle****. The* ***saw unit*** *is at its* ***fully down position*** *and, for a* ***mitre saw*** *with a sliding function, the* ***saw unit*** *is at its maximum extended horizontal position from the* ***fence****. The* ***mitre saw*** *is set for the* ***mitre angle*** *for which the* ***horizontal cutting capacity*** *measurement is desired.*

Horizontal cutting capacity*:*

The ***horizontal cutting capacity*** *is the perpendicular distance measured in the plane of the* ***table top*** *from the* ***fence*** *to the intersect point of the steel disc periphery in* ***quadrant*** *"C" with the plane of the* ***table top****.*

6 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

7 Classification

This clause of Part 1 is applicable.

8 Marking and instructions

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

8.1 *Addition:*

Mitre saws shall be marked with:

– **rated no-load speed** of the output spindle.

8.3 *Addition:*

Mitre saws shall be marked with the saw blade diameter(s). The marked value(s) shall not be larger than ***D*** and shall not be less than 0,96 ***D***.

Mitre saws shall be marked with the direction of rotation of the spindle, indicated in a visible location on the tool in the vicinity of the saw blade, such as on the saw blade **guard**, by an arrow raised or recessed or by any other means no less visible and indelible.

The **table top** on each side of the saw blade shall be marked with a sign as follows:

This symbol needs not be in accordance with the colour requirements of ISO 3864-2.

8.14.1 *Addition:*

The additional safety instructions as specified in 8.14.1.101 shall be given. This part may be printed separately from the “General Power Tool Safety Warnings”.

8.14.1.101 Safety instructions for mitre saws

a) **Mitre saws are intended to cut wood or wood-like products, they cannot be used with abrasive cut-off wheels for cutting ferrous material such as bars, rods, studs, etc.** *Abrasive dust causes moving parts such as the lower guard to jam. Sparks from abrasive cutting will burn the lower guard, the kerf insert and other plastic parts.*

b) **Use clamps to support the workpiece whenever possible. If supporting the workpiece by hand, you must always keep your hand at least 100 mm from either side of the saw blade. Do not use this saw to cut pieces that are too small to be securely clamped or held by hand.** *If your hand is placed too close to the saw blade, there is an increased risk of injury from blade contact.*

c) **The workpiece must be stationary and clamped or held against both the fence and the table. Do not feed the workpiece into the blade or cut “freehand” in any way.** *Unrestrained or moving workpieces could be thrown at high speeds, causing injury.*

d) **Push the saw through the workpiece. Do not pull the saw through the workpiece. To make a cut, raise the saw head and pull it out over the workpiece without cutting, start the motor, press the saw head down and push the saw through the workpiece.** *Cutting on the pull stroke is likely to cause the saw blade to climb on top of the workpiece and violently throw the blade assembly towards the operator.*

NOTE 1 The above warning is omitted for a simple pivoting arm **mitre saw**.

e) **Never cross your hand over the intended line of cutting either in front or behind the saw blade.** *Supporting the workpiece “cross handed” i.e. holding the workpiece to the right of the saw blade with your left hand or vice versa is very dangerous.*

f) **Do not reach behind the fence with either hand closer than 100 mm from either side of the saw blade, to remove wood scraps, or for any other reason while the blade is spinning.** *The proximity of the spinning saw blade to your hand may not be obvious and you may be seriously injured.*

g) **Inspect your workpiece before cutting. If the workpiece is bowed or warped, clamp it with the outside bowed face toward the fence. Always make certain that there is no gap between the workpiece, fence and table along the line of the cut.** *Bent or warped workpieces can twist or shift and may cause binding on the spinning saw blade while cutting. There should be no nails or foreign objects in the workpiece.*

h) **Do not use the saw until the table is clear of all tools, wood scraps, etc., except for the workpiece.** *Small debris or loose pieces of wood or other objects that contact the revolving blade can be thrown with high speed.*

i) **Cut only one workpiece at a time.** *Stacked multiple workpieces cannot be adequately clamped or braced and may bind on the blade or shift during cutting.*

j) **Ensure the mitre saw is mounted or placed on a level, firm work surface before use.** *A level and firm work surface reduces the risk of the mitre saw becoming unstable.*

k) **Plan your work. Every time you change the bevel or mitre angle setting, make sure the adjustable fence is set correctly to support the workpiece and will not interfere with the blade or the guarding system.** *Without turning the tool "ON" and with no workpiece on the table, move the saw blade through a complete simulated cut to assure there will be no interference or danger of cutting the fence.*

NOTE 2 The phrase "bevel or" does not apply for saws without bevel adjustment.

l) **Provide adequate support such as table extensions, saw horses, etc. for a workpiece that is wider or longer than the table top**. *Workpieces longer or wider than the mitre saw table can tip if not securely supported. If the cut-off piece or workpiece tips, it can lift the lower guard or be thrown by the spinning blade.*

m) **Do not use another person as a substitute for a table extension or as additional support.** *Unstable support for the workpiece can cause the blade to bind or the workpiece to shift during the cutting operation pulling you and the helper into the spinning blade.*

n) **The cut-off piece must not be jammed or pressed by any means against the spinning saw blade.** *If confined, i.e. using length stops, the cut-off piece could get wedged against the blade and thrown violently.*

o) **Always use a clamp or a fixture designed to properly support round material such as rods or tubing.** *Rods have a tendency to roll while being cut, causing the blade to "bite" and pull the work with your hand into the blade.*

p) **Let the blade reach full speed before contacting the workpiece.** *This will reduce the risk of the workpiece being thrown.*

q) **If the workpiece or blade becomes jammed, turn the mitre saw off. Wait for all moving parts to stop and disconnect the plug from the power source and/or remove the battery pack. Then work to free the jammed material.** *Continued sawing with a jammed workpiece could cause loss of control or damage to the mitre saw.*

r) **After finishing the cut, release the switch, hold the saw head down and wait for the blade to stop before removing the cut-off piece.** *Reaching with your hand near the coasting blade is dangerous.*

s) **Hold the handle firmly when making an incomplete cut or when releasing the switch before the saw head is completely in the down position.** *The braking action of the saw may cause the saw head to be suddenly pulled downward, causing a risk of injury.*

NOTE 3 The above warning applies only for **mitre saws** with a brake system.

8.14.2 a)

101) Instruction to identify the correct saw blade to be used for the material to be cut;

102) Information about cutting capacities;

103) Information about maximum **bevel angle** and **mitre angle** settings, as applicable;

104) Instruction to use only a saw blade diameter in accordance with the markings on the saw and information about the bore diameter and the maximum **kerf width** of the saw blade;

105) Instruction to use only saw blades that are marked with a speed equal or higher than the speed marked on the tool;

106) Instructions for the saw blade changing procedure including proper saw blade direction installation;

107) Instructions for adjusting the saw for proper cutting capacity, if applicable;

108) Instruction how to properly use the setting device(s) and the locking device(s) for the saw blade depth-of-cut stop, **mitre angle** and **bevel angle**, as applicable;

109) Instruction how to align the **fence**, if applicable;

110) Instruction how to check that the saw blade **guards** are functioning correctly;

111) Instruction how to connect dust extraction systems;

112) For **mitre saws** with sliding function: Instruction for the cutting sequence;

113) Instructions on how to set the depth of cut of the saw blade for non-through cuts, as applicable;

114) Instruction to ensure that the **mitre saw** is always stable and secure (e.g. fixed to a bench) and instruction how to fix the machine to a workbench or the like;

115) If adjustable and/or removable workpiece support extension(s) are provided to comply with 21.102.1, instruction to always fix and use these extension(s) during operation;

116) Instruction to use additional supports if needed to ensure the stability of the workpiece.

8.14.2 b)

101) Instruction on correct cutting operations, including cross cutting, **mitre angle** and **bevel angle** cutting procedures, as applicable;

102) Instruction on simple non-through cutting operations such as grooving/slotting;

103) Information about which materials can be cut. Instructions to avoid overheating the saw blade tips and, if cutting plastics is permitted, to avoid melting the plastic;

104) Instruction for proper use of the workpiece clamping device;

105) If the saw is provided with an interchangeable **kerf plate**: instructions how to remove and install the **kerf plate** and how to adjust the **kerf plate** height with respect to the **table top**, if applicable. Instruction to replace a worn **kerf plate**;

106) Instruction and the procedure to cut a slot in a zero clearance **kerf plate**, if applicable;

107) Instruction where to lift and support the **mitre saw** during transportation;

108) Instruction to avoid uncontrolled release of the **saw unit** from the **fully down position**.

8.14.2 c)

101) Instruction how to properly clean the tool and the guarding system.

9 Protection against access to live parts

This clause of Part 1 is applicable.

10 Starting

This clause of Part 1 is applicable.

11 Input and current

This clause of Part 1 is applicable.

12 Heating

This clause of Part 1 is applicable.

13 Resistance to heat and fire

This clause of Part 1 is applicable.

14 Moisture resistance

This clause of Part 1 is applicable.

15 Resistance to rusting

This clause of Part 1 is applicable.

16 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

17 Endurance

This clause of Part 1 is applicable.

18 Abnormal operation

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

18.8 *Replacement of Table 4:*

Table 4 – Required performance levels

Type and purpose of SCF	Minimum Performance Level (PL)
Power switch – prevent unwanted switch-on	Shall be evaluated using the fault conditions of 18.6.1 without the loss of this **SCF**
Power switch – provide desired switch-off	Shall be evaluated using the fault conditions of 18.6.1 without the loss of this **SCF**
Provide desired direction of rotation	Shall be evaluated using the fault conditions of 18.6.1 without the loss of this **SCF**
Any electronic control to pass the test of 18.3	c
Over-speed prevention to prevent output speed above 130 % of **rated no-load speed**	c
Provide run-down time as required by 19.103	a
Lock-off function as required by 21.18.2.101	b
Lower **guard** – prevent unwanted retraction or release of the locking device	c
Prevent exceeding thermal limits as in Clause 18	a

19 Mechanical hazards

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

19.1 *Replacement of the first paragraph:*

Moving and dangerous parts other than the rotating saw blade shall be so arranged or enclosed that adequate protection against injury is provided. The guarding of the rotating blade is covered in 19.101.

19.3 *Replacement:*

It shall not be possible to reach hazardous moving parts through dust collection openings with the **detachable parts** or provisions for dust collection removed, if any.

Compliance is checked by the following test.

For dust collection openings, the test probe B of IEC 61032 is used. The test probe is inserted with a force not exceeding 5 N into the dust collection opening until the probe's stop face reaches the plane of the dust collection opening and shall not touch hazardous moving parts.

19.7.101 A **mitre saw** shall be constructed so that during operation it will not tip over when the **saw unit** is inadvertently released from its **fully down position**.

*Compliance is checked by tests 1 and test 2, if applicable. The test 2 applies only if the **mitre saw** has a working stand either provided with the tool or specifically identified in accordance with 8.14.2. For both tests, the **mitre saw** is set to 0° **bevel angle** and the test is conducted at 0° and at maximum **mitre angle** settings. For **mitre saws** with a sliding action, the tests are conducted with the **saw unit** at its maximum and at its minimum extended position from the **fence**. If possible, the sliding mechanism is locked in the respective position. The tool is assembled in accordance with 8.14.2 a) 2) and fitted with a (2 ± 0,2) mm steel disc of diameter **D**.*

1) *The **mitre saw**, without a working stand and without being fixed to the supporting surface, is placed on horizontal medium density fibreboard (MDF) having a density of 650 kg/m^3 to 850 kg/m^3. An MDF workpiece of the same density as above, (20 ± 2) mm thick, 50 % of **horizontal cutting capacity** wide, a length equal to the length of the **table top** as required in 21.102 and divided with a **kerf width** to accommodate the saw blade, is positioned against the **fence** and the **saw unit** is moved down to its **fully down position**, and then the handle is released. The **mitre saw** shall not tip over.*
2) *The test is repeated with the **mitre saw** mounted to the working stand. The **mitre saw**/working stand shall not tip over.*

19.7.102 **Mitre saws** shall be provided with means to facilitate the fixing of the machine to a bench, e.g. by providing holes in the base.

Compliance is checked by inspection.

19.8 This subclause of Part 1 is applicable.

19.101 Saw blade guards

19.101.1 To reduce the hazard of incidental contact with the saw blade, the **mitre saw** shall be provided with a combination of an upper **guard** and a lower **guard**.

– The upper **guard** shall cover the **cutting edge zone** and the periphery of the saw blade at least in **quadrants** "A" and "B". See Figure 103. The upper **guard** shall be fixed with respect to the **saw unit**. To facilitate cutting a workpiece that is taller than the **vertical**

cutting capacity, the upper **guard** may incorporate a self-restoring workpiece-activated section with a maximum opening angle of 30° in **quadrant** “A”. When the flange/clamping nut is not circular, it shall be covered by the upper **guard**.

NOTE Additional requirements for the self-restoring workpiece-activated section are specified in 19.101.9 and 19.102.

– When the **saw unit** is in the **rest position**, the lower **guard** shall be in its saw blade covering position. Unless otherwise specified below, the lower **guard** in this position shall **guard** the **cutting edge zone** and the periphery of a saw blade having a diameter ***D*** in **quadrants** “C” and “D” that is not covered by the upper **guard**. See Figure 103. A maximum of 30° exposure of the **cutting edge zone** and the periphery in **quadrant** “D” is permissible, provided that the entire 30° exposure is located behind the plane of the **fence** workpiece supporting surface when the **saw unit** is in the **rest position**.

  The lower **guard** shall be self-restoring and be either:

  - “link-activated” complying with the requirements of 19.101.2; or
  - “workpiece-activated” complying with the requirements of 19.101.3; or
  - “manually actuated” complying with the requirements of 19.101.4.

*Compliance is checked by inspection and by measurement using a (2 ± 0,2) mm thick steel disc of diameter **D** in place of the saw blade.*

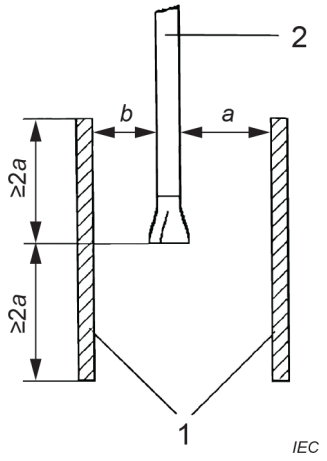
19.101.2 For the link-activated **guard**, the movement of the lower **guard** shall be linked with or controlled by the motion of the **saw unit**. The down directed plunging action of the **saw unit**’s motion shall cause the opening stroke of the lower **guard**. However, the lower **guard** shall be free to open further independent of the link, provided this additional movement is self-restoring.

Compliance is checked by inspection.

19.101.3 The workpiece-activated **guard** shall consist at least of two side barriers which, in the **rest position** of the **saw unit**, cover both sides of the saw blade **cutting edge zone** not covered by the upper **guard**. The workpiece-activated **guard** need not cover the periphery of the saw blade. The edge of the side barriers shall extend beyond the periphery of the largest recommended saw blade by at least twice the larger of the two side distances between the plane of the saw blade and the inside surface of the side barrier, see distance ‘*a*’ as illustrated in Figure 104. During the cutting action, the **guard** barriers shall open when they make contact with the **fence** or the workpiece and shall remain in contact with the **fence** or the workpiece.

The **guard** shall be automatically locked in the saw blade covering position as specified in 19.101.1 when the **saw unit** is in the **rest position**. The locking device shall be designed such that the lower **guard** can be unlocked by either hand of the operator without releasing the grasp on the handle.

*Compliance is checked by inspection, by measurement using a (2 ± 0,2) mm thick steel disc of diameter **D** in place of the saw blade and, for the **guard** locking device, by test 2 of 21.18.2.101.*



Key

a, *b* distances between the plane of the saw blade and the inside surface of the side barrier

1 side panel

2 saw blade

Figure 104 – Open guard construction

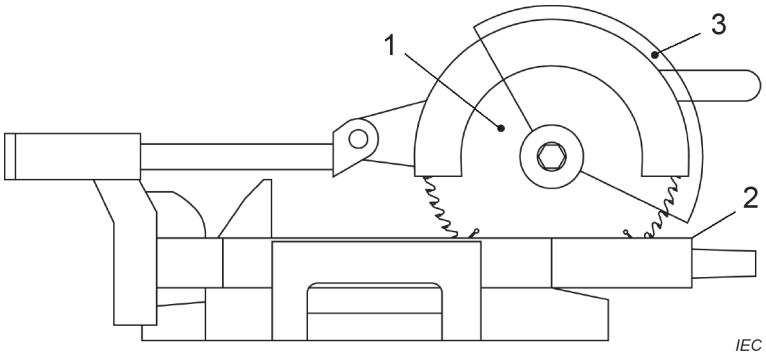
19.101.4 For the manually actuated **guard**, the opening of the **guard** shall be controlled by the same hand that the operator uses to control the **power switch** of the tool. The manual actuation may be used to partially open a **guard** not more than 30° in **quadrant** "C". Further opening of the **guard** may be achieved by a linkage as in a link-activated guard or by contact with the workpiece.

Compliance is checked by inspection and by measurement.

19.101.5 Lower **guards**, with the **saw unit** in the **fully down position**, shall guard against inadvertent contact with the saw blade in the **quadrant** "C".

Compliance is checked by the following test.

*With no workpiece present on the **table top**, the **mitre saw** is set to 0° **bevel angle** and 0° **mitre angle** and the **saw unit** is in the **fully down position**. For manually actuated **guards**, the actuating lever is then released. For **mitre saw** with a sliding function, the **saw unit** is at its maximum extended horizontal position from the **fence**. See Figure 105. A test rod with 12 mm diameter and 50 mm length, with the longitudinal axis of the test probe parallel to the **table top** surface and perpendicular to the cutting line, is applied with a force not exceeding 5 N along any straight line that is parallel with the plane of the **table top** surface and moved towards the **fence**. The test probe is applied with a force not exceeding 5 N and shall not touch the periphery of a (2 ± 0,2) mm thick steel disc of diameter **D** fitted to the **mitre saw** in place of the saw blade.*



Key

1 saw blade

2 table end

3 lower **guard**

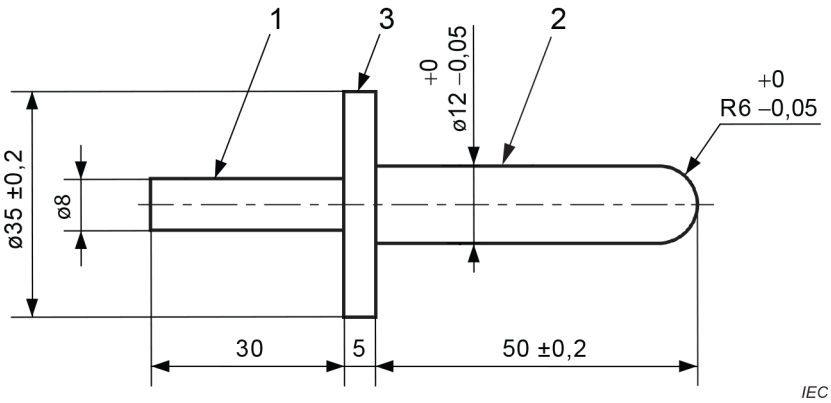
Figure 105 – Position of saw blade and lower guard relative to saw table

19.101.6 The **mitre saw** shall have a provision for the **saw unit** to be locked in a down position to facilitate transportation. In the locked position, the lower **guard** shall prevent access to the periphery of the saw blade in the **quadrant** "C".

Compliance is checked by inspection and by the following test applying the test probe of Figure 106.

*For **mitre saws** with a sliding function, the **saw unit** is at its minimum extended horizontal position from the **fence**. Starting from the operators' position the test probe is advanced towards the lower **guard**, spanning the slot in the **kerf plate** with the test section of the test probe, with the axis of the probe being perpendicular to the plane of the saw blade and the flange of the test probe guided on the plane of the **table top**. See Figure 107. The test probe shall not touch the periphery of a (2 ± 0,2) mm thick steel disc of diameter **D** fitted to the **mitre saw** in place of the saw blade.*

Dimensions in millimetres



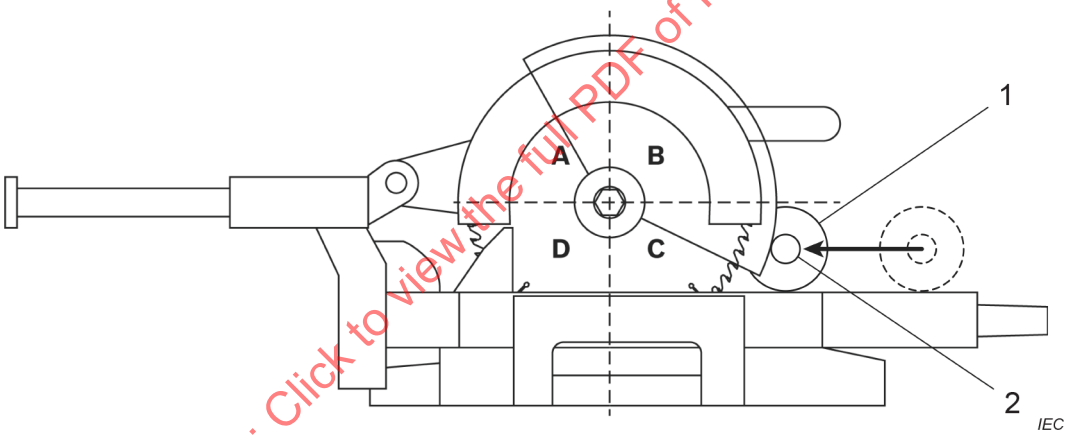
Key

1 handle section

2 test section

3 probe's flange

Figure 106 – Test probe



Key

1 test probe flange

2 test section of test probe

Figure 107 – Application of test probe

19.101.7 Mitre saws shall be so constructed that the saw blade cannot be touched from below the **table top**. Any components located below the **kerf plate** that are likely to be cut by the saw blade shall be made of a material (e.g. plastic, aluminium) that can easily be cut by the saw blade. However, the saw blade shall not cut through the structure to the bottom so that the saw blade can be touched from below the **table top**.

Compliance is checked by the following test.

*The **mitre saw** fitted with a saw blade of diameter **D** with a thickness corresponding to the maximum recommended **kerf width** in accordance with 8.14.2 a) 104) is set to 0° **mitre angle** and 0° **bevel angle**. The adjustment of the depth-of-cut in accordance 8.14.2 a) 108) is made to produce the **fully down position** of the **saw unit**. The saw is then operated and the **saw unit** moved to the **fully down position**. The saw blade may cut into any component below the **kerf plate**. For saws with a sliding function, the test is conducted with the **saw unit** in any horizontal position.*

*The saw is then switched off and the **saw unit** is moved down to its lowest possible position. The test probe of Figure 106, applied with a force not exceeding 5 N in any possible direction from below the **table top**, shall not touch the periphery of the saw blade. For saws with a sliding function, the test is conducted with the **saw unit** in any horizontal position.*

The test is repeated at

– *one-half the maximum right and left **bevel angle**; and*
– *the maximum right and left **bevel angle**,*

as applicable.

19.101.8 Any openings in the side barriers or in the periphery of the lower **guard**(**s**) shall be designed such as to minimize the ejection of the saw dust towards the operator and be of minimum size to prevent incidental contact with the saw blade.

NOTE Openings in the **guard** are typically provided to enhance the visibility of the saw blade or for the projection of laser line(s).

Compliance is checked by inspection and by the following test.

*The test probe B of IEC 61032 is applied with a force not exceeding 5 N to all openings within the lower **guard** surface area. The test probe shall not make contact with the **cutting edge zone** of a (2 ± 0,2) mm thick steel disc of diameter **D** fitted to the **mitre saw** in place of the saw blade. This test does not apply to the peripheral opening in a workpiece-activated **guard** that has to comply with the dimensional requirement in 19.101.3.*

19.101.9 The closing time of the lower **guard**(**s**) and of a workpiece-activated section in the **quadrant** “A” shall be of a sufficiently short duration to protect against incidental contact of the saw blade.

*Compliance is checked by either test 1, test 2 or test 3, as applicable, and conducted just prior to the endurance test of the return devices of 19.102. During the test, the **mitre saw** is set to 0° **bevel angle** and to 0° **mitre angle**. Test 1 applies to workpiece-activated lower **guards** and manually actuated lower **guards**. Test 2 applies to link-activated lower **guards**. Test 3 applies to workpiece-activated sections in the **quadrant** “A”.*

1) *The closing time of the **guard** in seconds from the fully open position to the saw blade covering position, as specified in 19.101.1, shall be less than the numerical equivalent of **D** expressed in metres.*

   *The fully open position of the **guard** is the position normally achieved by the movement of the **saw unit** to its **fully down position** and by the additional displacement of the **guard** as a result of cutting a workpiece with a thickness equal to the **vertical cutting capacity**.*

   *During the measurement, however, the **saw unit** is at **rest position**. The workpiece-activated lower **guard** locking device and the manual **guard** actuating device are appropriately operated to allow the **guards** to fully open.*

2) *The **saw unit** is moved to its **fully down position** and the lower **guard** is opened to a position that is equivalent to cutting a workpiece with a thickness equal to the maximum **vertical cutting capacity**. The lower **guard** closing time from this open position to the saw blade covering position corresponding to the **saw unit** being at the **fully down position** shall be less than 0,2 s.*

3) *A workpiece-activated section in the **quadrant** “A” is opened to its maximum position and then allowed to close. The closing time from the open position to the saw blade covering position as specified for the **quadrant** “A” in 19.101.1 shall be less than 0,2 s.*

19.102 Return devices

The return device of the **saw unit**, the lower **guard** and of the workpiece-activated section in the **quadrant** "A" shall have sufficient durability. In addition, the return device shall move the **saw unit** from the **fully down position** to the **rest position** within a reasonably short time.

Compliance is checked by the following test and by measurement.

*The **mitre saw** fitted with a (2 ± 0,2) mm thick steel disc of diameter **D** in place of the saw blade is set to 0° **bevel angle** and 0° **mitre angle** settings and the **saw unit** is in the **rest position**. The **saw unit** is lowered from the **rest position** with no sliding action, if any, to the **fully down position**, then released. The time to return to the **rest position**, including the lower **guard** protection as required in 19.101.2, 19.101.3 or 19.101.4, as applicable, shall not exceed 1 s.*

*For the endurance test, the **saw unit** is moved to its **fully down position** with a time period of at least 1 s and allowed to return to its **rest position** with a time period of at least 3 s, i.e. the return movement is deliberately slowed down to reflect typical use. This down and up movement of the **saw unit** is repeated for 50 000 cycles.*

*The **mitre saw** under this test may be set up such, if possible or desired, that concurrently with the **saw unit** return device durability test, the lower **guard** is also made to be cycled from fully open, as defined by 19.101.9, to the saw blade covering position as specified in 19.101.1. If the lower **guard** cycling durability is not conducted concurrently with the **saw unit** return device durability, then the lower **guard** durability shall be conducted separately for 50 000 cycles. If the lower **guard** is tested separately from the **saw unit** return device durability, the opening action of each cycle is conducted with a time period of at least 1 s and the closing action with a time period of at least 3 s.*

*The workpiece-activated section in the **quadrant** "A", if applicable, shall be cycled for 5 000 cycles.*

After the conclusion of the return devices endurance tests:

- *the return time of the **saw unit** from the **fully down position** to a position where the lower **guard** protection is as required in 19.101.2, 19.101.3 or 19.101.4, as applicable, shall not exceed 2 s;*
- *the closing time of the lower **guards** and of a workpiece-activated section in the **quadrant** "A" shall be less than 140 % of the requirements set by 19.101.9;*
- *the **saw unit** shall automatically return when released from approximately 25 %, 50 % and 75 % of the **fully down position** such that the degree of the lower **guard** protection is as required in 19.101.2, 19.101.3 or 19.101.4, as applicable.*

19.103 Run-down time

The run down time of the saw blade shall not exceed 10 s after switching off the motor. Device(s), if any, to achieve the 10 s run-down time shall not be applied directly to the saw blade or to the saw blade driving flanges.

Compliance is checked by inspection and by the following test, which is performed ten times.

*A steel test disc with a thickness of (2 ± 0,1) mm and a diameter **D** is mounted to the tool. The tool motor is switched on for a minimum of 30 s, then switched off. The run-down time is measured. For each test, the run-down time shall not exceed 10 s.*

20 Mechanical strength

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

20.1 *Addition:*

The upper **guard** and lower **guard** for the saw blade as specified in 19.101.1 shall be manufactured from any of the following:

a) metal having the following characteristics:

Ultimate tensile strength N/mm^2	Minimum thickness mm
≥ 380	1,25
≥ 350 and < 380	1,50
≥ 200 and < 350	2,00
≥ 160 and < 200	2,50

b) polycarbonate with a wall thickness of at least 3 mm;

c) other non-metallic material of at least 3 mm thickness with an ultimate tensile strength of at least 60 N/mm^2 and an Izod notched impact strength of at least 60 kJ/m^2 in accordance with ISO 180.

Compliance is checked by inspection, by measurement and by either receipt of confirmation of the ultimate strength of the material from the material manufacturer or through measurement of samples of the material.

20.5 This subclause of Part 1 is not applicable.

20.101 Means for transportation of the **mitre saw** as required by 19.4 and as described in the instructions in accordance with 8.14.2 b) 107) shall be of adequate strength to safely transport the machine.

Compliance is checked by inspection and by the following test.

Carrying means are subjected to a force corresponding to three times the weight of the equipment but not more than 600 N per carrying means. The force is applied in the direction of lifting uniformly over a 70 mm width at the centre of the carrying means. The force is steadily increased so that the test value is attained within 10 s and maintained for a period of 1 min.

If more than one carrying means is provided or if a portion of the weight is distributed over a wheel, the force is distributed between the carrying means in the same proportion as in the normal transportation position. If the equipment is provided with more than one carrying means, but so designed that it may readily be carried by only one carrying means, each carrying means shall be capable of sustaining the total force.

The carrying means shall not break loose from the equipment and there shall not be any permanent distortion, cracking or other evidence of failure.

20.102 A working stand for a **mitre saw**, if provided with the tool or if specifically identified in accordance with 8.14.2, shall have adequate strength.

Compliance is checked by the following test.

*The **mitre saw** is mounted to the working stand and an additional vertical force of 3**D** is gradually applied for 1 min, distributed equally on the **table top** of the **mitre saw**. During the test, the working stand shall not collapse, and after removing the force, it shall not show any permanent deformation.*

NOTE Equal distribution of the additional force can be achieved by using bags of sand or other similar means.

21 Construction

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

21.18.2 *Replacement:*

Mitre saws shall be fitted with a **momentary power switch** which can be switched on and off by either hand of the user from the operator's position as specified in accordance with 8.14.2, without releasing the grasp of the **saw unit's** handle. The actuation of the **power switch** shall not be affected or restricted by the position of the **turn table** or by the workpiece.

Compliance is checked by inspection.

21.18.2.1 This subclause of Part 1 is not applicable.

21.18.2.2 This subclause of Part 1 is not applicable.

21.18.2.3 This subclause of Part 1 is not applicable.

21.18.2.4 This subclause of Part 1 is not applicable.

21.18.2.101 In order to reduce the risk associated with starting an unintentional cutting action, the **mitre saw** shall meet the requirement of either a), b) or c).

a) The **power switch** shall be provided with a lock-off device with an actuation means that is independent of the actuation means of the **power switch** and that can be operated by either hand of the user. If the actuations of the lock-off device and of the **power switch** are operated in the same direction, then the lock-off actuation shall be operated prior to the actuation of the **power switch**.

b) The **saw unit** of a **mitre saw** shall be automatically locked when the **saw unit** is in its uppermost position. The locking device shall be designed such that the **saw unit** can be unlocked by either hand of the operator without releasing the grasp on the handle.

c) The lower **guard** of a **mitre saw** shall be automatically locked when the lower **guard** is in its saw blade covering position as specified in 19.101.1. The locking device shall be designed such that the lower **guard** can be unlocked by either hand of the operator without releasing the grasp on the handle.

Compliance with a) is checked by inspection.

NOTE Lock-off devices for **power switches** are also subject to the durability requirements of 21.17.1.

Compliance with b) is checked by the following test.

*The **saw unit** fitted with a (2 ± 0,2) mm thick steel disc of diameter **D** in place of the saw blade is in the **rest position** at 0° **bevel angle** and 0° **mitre angle** setting. The operating handle of the **saw unit** at the highest point is subjected to a load of 150 N vertically downwards. The minimum distance between the steel disc periphery and the **table top**, before and after applying the load, shall not be diminished by more than 15 mm.*

*Compliance with c) is checked by test 1 for the link-activated and manually-actuated **guards** and test 2 for workpiece-activated **guards**.*

*1) The **saw unit** is in the **rest position** at 0° **bevel angle** and 0° **mitre angle** setting. The lower **guard** is subjected to a load of 50 N in the direction of opening activation at the location that is most likely to defeat the integrity of the locking system and to activate the opening of the **guard**. The lower **guard** in **quadrant** "D" shall not expose the periphery of the steel disc by more than 5° from a saw blade exposure existing in the **rest position**.*

2) *The **saw unit** at 0° **bevel angle** and 0° **mitre angle** setting is moved such that the locked lower **guard** contacts the **table top**. The operating handle of the **saw unit** at the highest point is subjected to a load of 150 N vertically downwards. The bottom edge of the side barriers shall not come closer to the steel disc rim than the larger of the two side distances between the plane of the steel disc and the inside surface of the side barrier.*

*After the conclusion of the tests for b) and c), the lower **guard** shall remain in compliance with the requirements of 19.101.*

21.30 This subclause of Part 1 is not applicable.

21.35 This subclause of Part 1 is applicable.

21.101 Construction to facilitate cutting tool installations

21.101.1 The **mitre saw** guarding system shall allow changing of the saw blade without removing the lower **guard** from the machine.

Compliance is checked by inspection.

21.101.2 Mitre saws shall be provided with a saw blade. The **mitre saw** shall be constructed so that saw blades with diameters larger than intended for the saw cannot be mounted.

*Compliance is checked by inspection and by the following test. It shall not be possible to freely mount a (2 ± 0,2) mm thick steel disc with a diameter 12 mm or 3 % larger than **D**, whichever is larger.*

21.102 Table top

21.102.1 The **table top** shall be so designed that it extends in a direction parallel with the **fence** on each side of the saw blade to provide for an adequate workpiece securing zone and have a sufficient dimension perpendicular to the plane of the **fence**, for the stability of the workpiece. If workpiece support extension(s) are used to comply with the above requirement, they shall not be removable without the aid of a tool. If they are adjustable, they shall be capable of being fixed during operation. The **table top** surfaces need not be continuous.

Compliance is checked by inspection and by the following test.

*The saw blade is set to the maximum **mitre angle** at 0° **bevel angle**. The **saw unit** is at its **fully down position** and for a **mitre saw** with a sliding function, the **saw unit** is at its maximum extended horizontal position from the **fence**. The **mitre saw** is fitted with a (2 ± 0,2) mm thick steel disc of diameter **D** in place of the saw blade.*

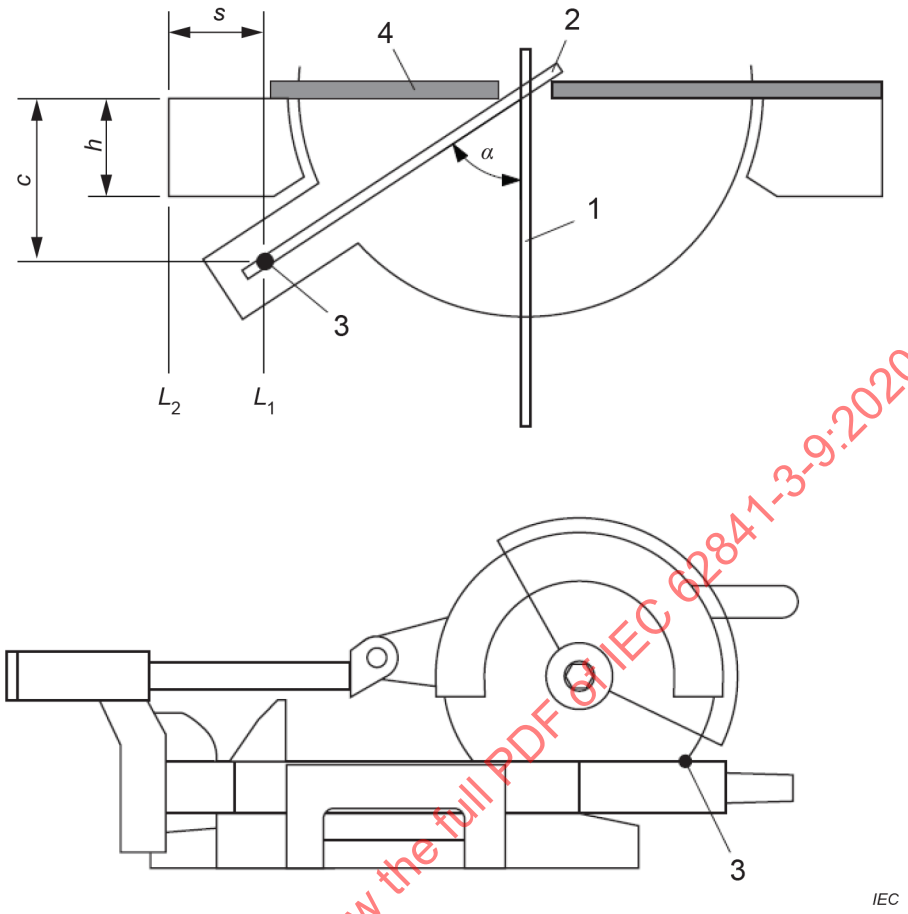
*A line L_1 is established that is the perpendicular projection onto the plane of the **fence** of the intersect point (key item 3 in Figure 108) of the steel disc periphery in **quadrant** "C" with the plane of the **table top**.*

*The measurement of the total amount of support (dimension "h" in Figure 108) along a line L_2 parallel to L_1 at least 100 mm (dimension "s" in Figure 108) measured from the plane of the **fence** shall be at least*

- *80 % of dimension "C" in Figure 108 for a simple pivoting arm **mitre saw**; or*
- *50 % of dimension "C" in Figure 108 for a **mitre saw** with a sliding function.*

*If applicable, the test is then repeated with the **saw unit** set to the maximum **mitre angle** at 0° **bevel angle** on the opposite side of the **mitre saw**.*

NOTE Some **mitre saw** designs have different maximum **mitre angles** on the left and right mitre side, leading to different minimum table dimensions on either mitre side.



Key

α maximum **mitre angle** (left mitre side shown)

s minimum workpiece support parallel to the **fence**

h minimum workpiece support perpendicular to the **fence**

C **horizontal cutting capacity** at maximum **mitre angle**

1 steel disc at 0° **bevel angle** and 0° **mitre angle**

2 steel disc at 0° **bevel angle** and maximum **mitre angle**

3 steel disc and table top intersect point at 0° **bevel angle** and maximum **mitre angle**

4 **fence**

Figure 108 – Workpiece support dimensions

21.102.2 The horizontal planes of the **turn table** and of the fixed part of the table base shall not be vertically offset from the plane defined by the **kerf plate** by more than ± 1,0 mm. The table base and the **turn table** surfaces need not be continuous.

Compliance is checked by inspection and by measurement.

21.102.3 The **mitre saw** shall be provided with a **kerf plate**. But for the slot in the **kerf plate**, to accommodate the saw blade, the **kerf plate** surface shall be continuous. The slot in the **kerf plate** for the saw blade shall be no more than 12 mm wide. The **kerf plate** may be interchangeable in accordance with 8.14.2 b) 105), provided the change requires the use of a tool. The **kerf plate** shall be made of a material that can easily be cut, e.g. plastic, wood or aluminium.

Compliance is checked by inspection and by measurement.

21.103 Table fence

21.103.1 A **fence** shall be provided on each side of the saw blade and shall be of an adequate length to provide support of the workpiece. The **fence** shall have a minimum height of 0,6 times **vertical cutting capacity** at 0° **bevel angle** setting except that portions of the **fence**(s) may be either adjustable or profiled as necessary to allow the saw blade, flange, **guard** and motor housing, as applicable, to pass under all cutting conditions. The face of the **fence** need not be continuous.

Compliance is checked by inspection and by measurement.

On each side of the saw blade, the **fence** shall extend at least the greater of:

– ¾ ***D***; or

– the perpendicular distance *E* from the plane of the steel disc at 0° **bevel angle** and 0° **mitre angle** to the intersect point (key item 3 in Figure 109) of the steel disc periphery in **quadrant** “C” in its **fully down position** with the plane of the **table top** at 0° **bevel angle** and the maximum **mitre angle** on that side of the saw blade. See Figure 109.

At 0° **mitre angle** and 0° **bevel angle**, the gap measured in the front plane of the **fences** and parallel to the **table top** (see Figure 110), between the closest point of the adjustable or profiled **fence** on each side and the surface of a (2 ± 0,2) mm steel disc of diameter ***D*** mounted in place of the saw blade to the **mitre saw** shall not exceed:

– 20 mm, for designs with a **centre workpiece support**;

– 8 mm, for all other saws.

Compliance is checked by measurement.

The part of the **fence** adjacent to the saw blade shall be made from material that can easily be cut by the saw blade, e.g. aluminium, plastic or wood.

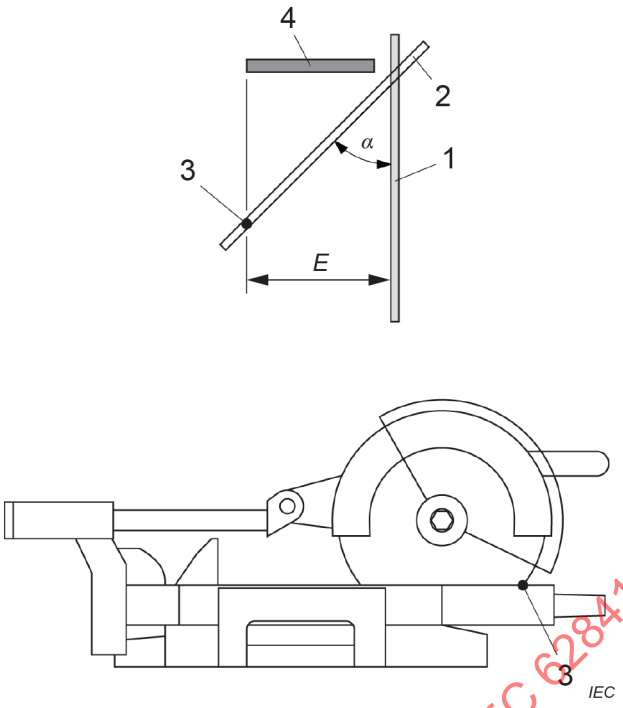
Compliance is checked by inspection.

The vertical planes of the **fence** faces on either side of the steel disc including the face of the **centre workpiece support**, if any, shall be sufficiently aligned to minimize the likelihood of displacement of the workpiece during the cut.

Compliance is checked by the following test.

*The saw is set to 0° **mitre angle** and 0° **bevel angle**. The **fence** is set to produce the minimum gap between the steel disc and the **fence** faces. If applicable, the **fence** is adjusted in accordance with 8.14.2 a) 109). A straight edge with sufficient length to span the entire **fence** is held against the **fence** at a height of (25 ± 2) mm above and parallel to the **table top** such that there is at least one point of contact on the **fence** face at either side of the steel disc. The gap between the straight edge and the **fence** or any **centre workpiece support** at any point shall not exceed 2 mm. The **centre workpiece support**, if any, shall not protrude beyond the line of the straight edge.*

*If provided, the test is repeated for **fences** with multiple sections with the straight edge parallel to the **table top** at a height corresponding to the centre of the additional section(s). If there is no corresponding **fence** face on the opposite side of a multiple section, a measurement is not required for that section.*



Key

α maximum **mitre angle** (left mitre side shown)

E minimum extension of the **fence** (see 21.103)

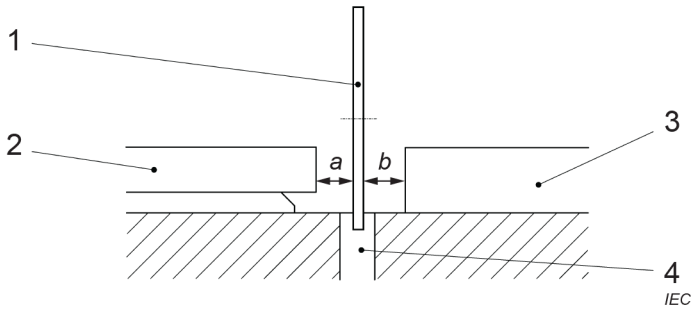
1 steel disc at 0° **bevel angle** and 0° **mitre angle**

2 steel disc at 0° **bevel angle** and maximum **mitre angle**

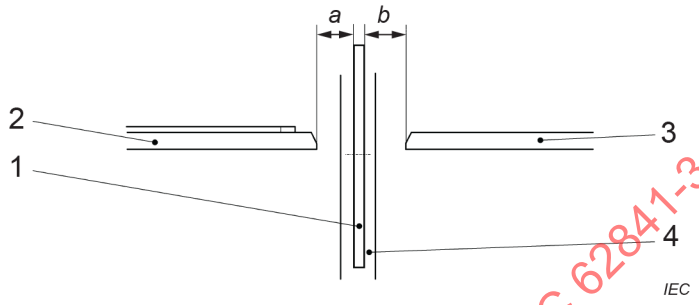
3 intersect point of the steel disc periphery in **quadrant** "C" at its **fully down position** with the plane of the **table top** at 0° **bevel angle** and the maximum **mitre angle**

4 **fence**

Figure 109 – Minimum extension of fence



a) Front view



b) Top view

Key

a, b	gap between the **fence** and the steel disc
1	steel disc
2	adjustable part of a **fence**
3	fixed **fence**
4	slot in the table/**kerf plate**

Figure 110 – Distance between fence and saw blade

21.103.2 Centre workpiece support

If a **centre workpiece support** is provided, as illustrated in Figure 101, it shall not interfere with any cutting operation and shall be made of a material that can be easily cut, e.g. aluminium, plastic or wood. The **centre workpiece support** shall have a minimum height of 0,35 times the **vertical cutting capacity** at 0° **bevel angle** setting, measured from the plane defined by the **kerf plate**. The total face width of the **centre workpiece support** shall be at least 6 mm including the slot, except for portions of the face that have to be profiled as necessary to be set for any cutting operation. The slot of the **centre workpiece support** shall align with the plane of the saw blade for any **bevel angle** or **mitre angle** setting. The **centre workpiece support** shall be capable of adjustment such that there is at least one point of support aligned with the plane of the **fence** and that no other point extends in front of the plane of the **fence**. This may be achieved by automatic or manual adjustment.

Compliance is checked by inspection and by measurement.

21.104 Workpiece clamp

21.104.1 M**itre saws** shall be provided with at least one workpiece clamping device.

Compliance is checked by inspection.

21.104.2 The **table top** of the **mitre saw** shall be designed for the workpiece clamp(s) to be used at least for a vertical clamping on either side of the saw blade.

Compliance is checked by inspection and by manual test.

21.105 Spindle and flanges

21.105.1 The **mitre saw** spindle shall have a diameter for mounting the saw blade not less than 12 mm for a saw blade having a diameter ***D*** less than or equal to 255 mm and not less than 15 mm for a saw blade having a diameter of greater than 255 mm. The ultimate tensile strength for the spindle shall be a minimum of 350 N/mm².

Compliance is checked by inspection, by measurement and by either receipt of confirmation of the ultimate tensile strength of the material from the material manufacturer or through measurement of samples of the material.

21.105.2 The **mitre saw** spindle shall have a rotation that advances the saw blade tips from **quadrant** "A" to **quadrant** "B" and so on. The spindle shall have a provision to be keyed to the outer saw blade flange or it shall otherwise prevent the rotation of the flange with respect to the spindle.

Compliance is checked by inspection.

21.105.3 In order to limit vibration due to unbalance of the saw blade, the total possible eccentricity of the parts locating the saw blade shall be limited.

Compliance is checked by measurement. The eccentricity, measured as the difference between the maximum and minimum reading of the indicator, shall be less than 0,2 mm.

21.105.4 The saw blade retaining fastener(s) in conjunction with the spindle shall not loosen under any operations, such as saw blade acceleration during start-up and rapid saw blade deceleration induced by motor braking devices, if any.

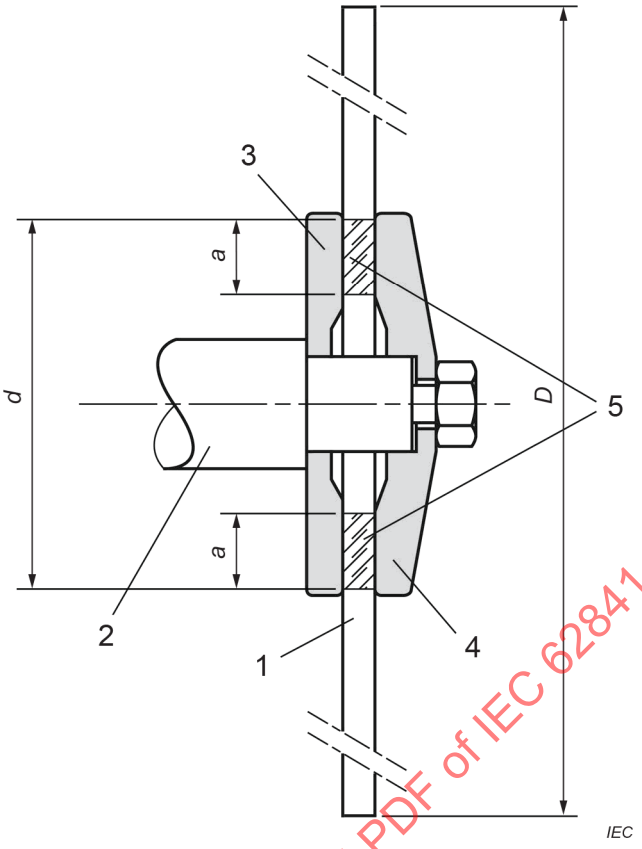
Compliance is checked by the following test.

*A (2 ± 0,2) mm steel disc of diameter **D** is mounted to the **mitre saw**. The **mitre saw** is started from the **rest position**, allowed to reach operating speed and shut down. This cycle is repeated ten times. The saw blade shall not become loose during and at the conclusion of the test.*

21.105.5 The saw blade supporting flanges, as illustrated in Figure 111, shall:

– have an outer diameter of the clamping surface overlap of the flanges of at least ***D***/6;
– be keyed by the outer flange to the spindle or otherwise prevented from rotation with respect to the spindle;
– have a clamping surface overlap *a* of the inner and outer flange of at least 0,1 times the diameter of the smaller flange.

Compliance is checked by inspection and by measurement.



Key

a clamping surface overlap
D maximum specified saw blade diameter
d outer diameter of the clamping surface overlap
1 saw blade
2 output spindle
3 inner flange
4 outer flange
5 clamping surface overlap area

Figure 111 – Flange characteristics

22 Internal wiring

This clause of Part 1 is applicable.

23 Components

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

23.3 This subclause of Part 1 is not applicable.

24 Supply connection and external flexible cords

This clause of Part 1 is applicable.

25 Terminals for external conductors

This clause of Part 1 is applicable.

26 Provision for earthing

This clause of Part 1 is applicable.

27 Screws and connections

This clause of Part 1 is applicable.

28 Creepage distances, clearances and distances through insulation

This clause of Part 1 is applicable.

Annexes

The annexes of Part 1 are applicable, except as follows:

Annex I
(informative)

Measurement of noise and vibration emissions

NOTE In Europe (EN 62841-3-9), Annex I is normative.

I.2 Noise test code (grade 2)

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

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

Addition:

Saws supplied with a working stand are placed on this working stand standing on a reflecting plane.

Other saws are placed on a test bench as shown in Figure I.1 standing on a reflecting plane.

I.2.5 Operating conditions

Addition:

Mitre saws are tested under load under the conditions shown in Table I.101.

Table I.101 – Noise test conditions for mitre saws

Material	Beech – 20 mm × 2/3 **horizontal cutting capacity**, but not more than 200 mm – planed on four sides
Feed force	Just sufficient to cut at a brisk pace without overloading the machine
Width of cut-off	15 mm minimum at 0° **mitre angle** and 0° **bevel angle**
Test cycle	Five cuts quickly following each other constitutes one complete test cycle. The measurement is conducted (averaged) over the complete test cycle
Tool bit	New saw blade, tungsten carbide tipped for crosscutting and having the maximum specified blade diameter ***D***, to be used for the entire series of tests

I.3 Vibration

This clause of Part 1 is not applicable.

Annex K
(normative)

Battery tools and battery packs

All clauses of the main body of this Part 3-9 apply unless otherwise specified in this annex. If a clause is stated in this annex, its requirements replace the requirements of the main body of this Part 3-9 unless otherwise specified.

K.21.18.2.101 *Modification:*

Items b) and c) are not applicable.

Annex L
(normative)

Battery tools and battery packs provided with mains connection or non-isolated sources

All clauses of the main body of this Part 3-9 apply unless otherwise specified in this annex. If a clause is stated in this annex, its requirements replace the requirements of the main body of this Part 3-9 unless otherwise specified.

L.21.18.2.101 *Modification:*

Items b) and c) are not applicable.

Bibliography

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

Addition:

IEC 62841-3-10, *Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety – Part 3-10: Particular requirements for transportable cut-off machines*

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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OUTILS ÉLECTROPORTATIFS A MOTEUR, OUTILS PORTABLES ET MACHINES POUR JARDINS ET PELOUSES – SÉCURITÉ –

Partie 3-9: Exigences particulières pour les scies à onglets transportables

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La Norme internationale IEC 62841-3-9 a été établie par le comité d'études 116 de l'IEC: Sécurité des outils électroportatifs à moteur.

Cette deuxième édition annule et remplace la première édition parue en 2014. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) Article 1: Domaine d'application: augmentation du diamètre maximal de la lame de scie à 410 mm;

b) Le Corrigendum 1 et le Corrigendum 2 de la première édition ont été incorporés dans la présente deuxième édition.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
116/430/FDIS	116/442/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

La présente Partie 3-9 doit être utilisée conjointement avec l'IEC 62841-1:2014.

La présente Partie 3-9 complète ou modifie les articles correspondants de l'IEC 62841-1 de façon à transformer cette dernière en norme IEC: Exigences particulières pour les scies à onglets transportables.

Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans la présente Partie 3-9, ce paragraphe s'applique dans la mesure du raisonnable. Lorsque la présente Norme spécifie "addition", "modification" ou "remplacement", le texte correspondant de la Partie 1 doit être adapté en conséquence.

Les caractères d'imprimerie suivants sont employés:

– exigences: caractères romains;
– *modalités d'essai: caractères italiques*;
– notes: petits caractères romains.

Les termes définis à l'Article 3 figurent en **caractères gras**.

Les paragraphes, notes et figures complémentaires à ceux de la Partie 1 sont numérotés à partir de 101.

Une liste de toutes les parties de la série IEC 62841, publiées sous le titre général: *Outils électroportatifs à moteur, outils portables et machines pour jardins et pelouses – Sécurité,* peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous “http://webstore.iec.ch” dans les données relatives à la publication recherchée. À cette date, la publication sera

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- amendée.

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OUTILS ÉLECTROPORTATIFS A MOTEUR, OUTILS PORTABLES ET MACHINES POUR JARDINS ET PELOUSES – SÉCURITÉ –

Partie 3-9: Exigences particulières pour les scies à onglets transportables

1 Domaine d'application

L'article de la Partie 1 s'applique, avec l'exception suivante:

Addition:

La présente partie de l'IEC 62841 s'applique aux **scies à onglets** transportables destinées à être utilisées avec une lame de scie dentée pour la coupe du bois et de matériaux analogues, de plastiques et de métaux non ferreux à l'exception du magnésium, la lame de scie ayant un diamètre ne dépassant pas 410 mm, celle-ci pouvant être simplement désignée ci-après comme scie ou outil.

La présente Norme internationale ne s'applique pas aux **scies à onglets** utilisées pour couper d'autres métaux, tels que le magnésium, l'acier et le fer. Le présent document ne s'applique pas aux **scies à onglets** équipées d'un appareil d'alimentation automatique.

NOTE 101 Les scies transportables destinées à couper des métaux ferreux seront couvertes par une future partie de l'IEC 62841-3.

Le présent document ne s'applique pas aux scies destinées à être utilisées avec un disque abrasif.

NOTE 102 Les **outils portables** conçus pour être utilisés avec un disque abrasif sont couverts par l'IEC 62841-3-10.

Le présent document ne s'applique pas aux outils qui combinent la fonction de **scie à onglets** et la fonction de scie circulaire à table.

NOTE 103 Les **outils portables** qui combinent la fonction de **scie à onglets** et la fonction de scie circulaire à table sont couverts par une future partie de l'IEC 62841-3.

2 Références normatives

L'article de la Partie 1 s'applique, avec l'exception suivante:

Addition:

ISO 180, *Plastiques – Détermination de la résistance au choc Izod*

3 Termes et définitions

L'article de la Partie 1 s'applique, avec l'exception suivante:

3.101
angle de biseau
déplacement angulaire du plan de coupe par rapport au plan du **plateau de la table**, la position du plan de coupe perpendiculaire au **plateau de la table** correspondant à l'angle de biseau de 0°

3.102
angle composé
déplacement angulaire du plan de coupe dont l'**angle** de **biseau** et d'**onglet** n'est pas de 0°

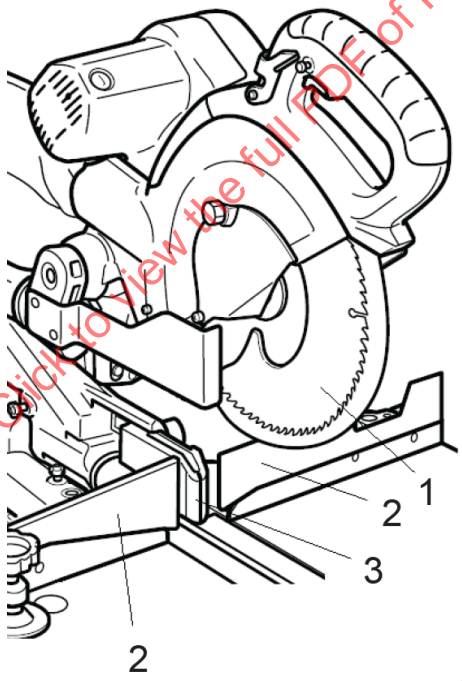
3.103
zone de bord de coupe
zone radiale de 20 % mesurée vers le bord extérieur de la lame de scie

3.104
D
diamètre spécifié de la lame de scie

3.105
guide
appareil utilisé pour positionner la pièce et absorber les forces horizontales produites par la lame de scie pendant la coupe

3.105.1
support central de la pièce
dispositif dont une face supporte la pièce conjointement au **guide**

Note 1 à l'article: Voir la Figure 101.



Légende

1 lame de la scie

2 **guides**

3 **support central de la pièce**

Figure 101 – Scie à onglets avec support central de la pièce

3.106
position d'arrêt complet
position de l'**outil de coupe** après réglage de la scie conformément à 8.14.2 a) 107) et toute butée de profondeur de coupe selon 8.14.2 a) 108) désactivée ou réglée afin d'obtenir la position la plus basse de l'**outil de coupe**

3.107
capacité de sciage horizontal
dimension maximale perpendiculaire au plan du **guide** (largeur) d'une pièce de section rectangulaire qui peut être entièrement coupée par un passage unique de la lame de scie

Note 1 à l'article: Voir 5.101 pour le mode opératoire de mesure pour la **capacité de sciage horizontal**.

3.108
largeur du trait de scie
distance entre deux plans parallèles qui touchent les faces opposées d'au moins trois sommets de dent de la lame de scie

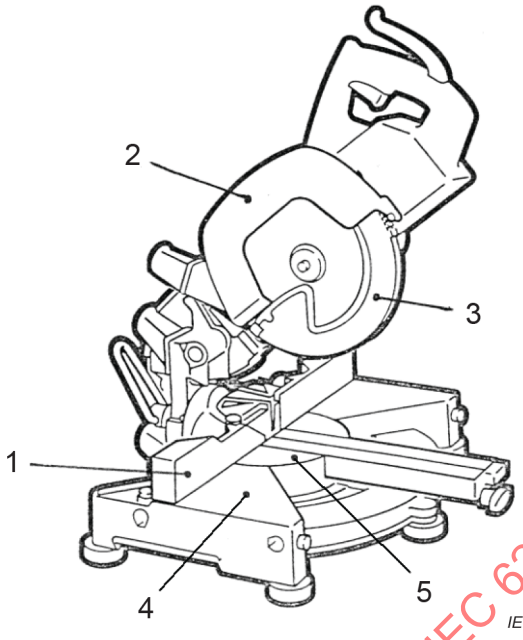
3.109
plaque de saignée
partie du **plateau de la table** des deux côtés de la ligne d'intersection de la lame de scie avec ledit **plateau** afin de réduire le plus possible le déchirement des fibres ligneuses par la lame de scie

Note 1 à l'article: En fonction du modèle, la **plaque de saignée** est réglable, remplaçable ou intégrée au **plateau de la table**.

3.110
angle d'onglet
déplacement angulaire du plan du **guide** par rapport à la ligne de coupe, la position du plan de coupe perpendiculaire au plan du **guide** correspondant à l'angle d'onglet de 0°

3.111
scie à onglets
scie constituée d'un **plateau de la table** et d'un **guide** qui supportent et positionnent la pièce, ainsi que d'un **outil de coupe**, faisant saillie au-dessus du **plateau de la table**

Note 1 à l'article: La coupe s'effectue par déplacement de l'**outil de coupe** au moyen d'un sciage en plongée ou d'une combinaison d'un sciage en plongée et d'un sciage coulissant. La pièce ne se déplace pas par rapport au **plateau de la table** ou au **guide** lors de la coupe. L'**outil de coupe** peut être réglable afin de couper à un **angle de biseau**, un **angle d'onglet** ou aux deux angles afin d'obtenir une coupe à **angle composé**. Voir la Figure 102.



Légende

1 **guide**

2 **protecteur** supérieur

3 **protecteur** inférieur

4 socle de plateau

5 **plateau rotatif**

Figure 102 – Scie à onglets

3.112
quartiers
parties de la lame de scie définies par deux lignes d'intersection avec le centre de la lame de scie, avec l'**outil de coupe** en **position d'arrêt complet**, dont une ligne est parallèle au **plateau de la table** et l'autre ligne est perpendiculaire à la première ligne

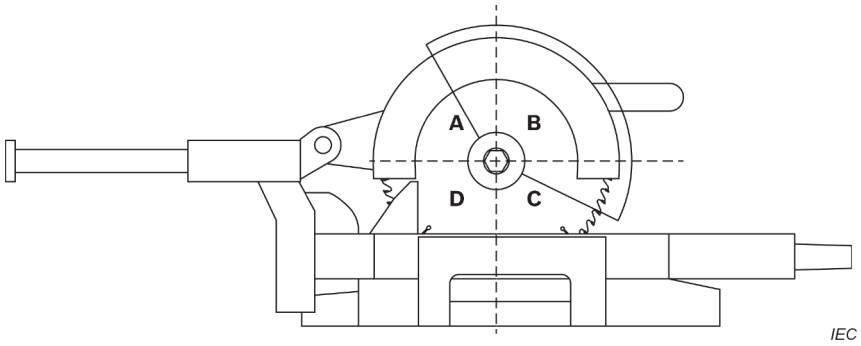
Note 1 à l'article: Les **quartiers** restent fixes par rapport à l'**outil de coupe** qui se déplace entre la **position de repos** et la **position d'arrêt complet** (voir la Figure 103):

– le **quartier** "A" se situe au-dessus de la ligne parallèle au **plateau de la table** et à distance de la position de l'opérateur;

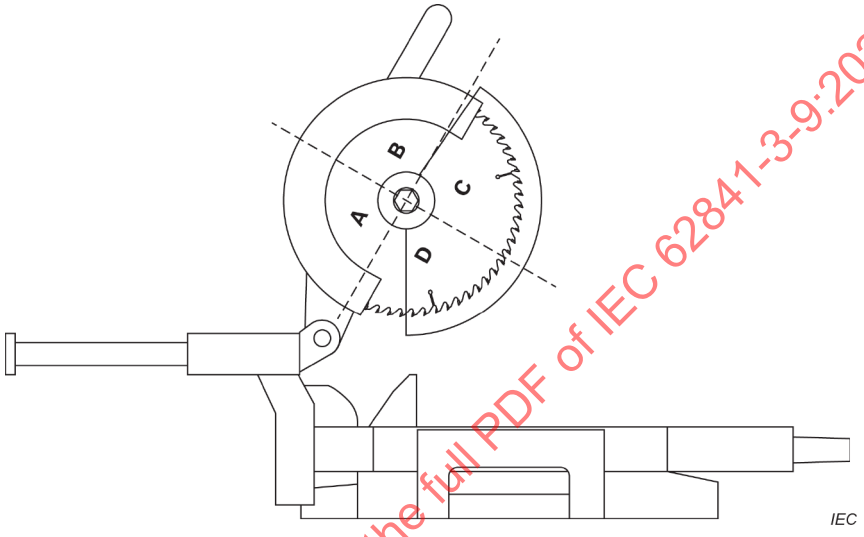
– le **quartier** "B" se situe au-dessus de la ligne parallèle au **plateau de la table** et plus proche de la position de l'opérateur;

– le **quartier** "C" se situe en dessous de la ligne parallèle au **plateau de la table** et plus proche de la position de l'opérateur;

– le **quartier** "D" se situe en dessous de la ligne parallèle au **plateau de la table** et à distance de la position de l'opérateur.



a) Outil de coupe en position d'arrêt complet



b) Outil de coupe en position de repos

Figure 103 – Quartiers de lame de scie

3.113
position de repos
position d'un **outil de coupe** dans sa position la plus élevée par rapport au **plateau de la table** et, pour les **scies à onglets**, avec un sciage coulissant, à la position coulissante maximale en direction du **guide**

3.114
outil de coupe
appareil équipé d'une lame de scie apposée, capable d'effectuer une coupe

3.115
plateau de la table
surface horizontale en contact avec la pièce qu'elle supporte, et comprenant généralement un **plateau rotatif**, un socle de plateau de chaque côté du **plateau rotatif** et une (des) extension(s) du support de la pièce

Note 1 à l'article: Voir la Figure 102.

3.116
plateau rotatif
dispositif de support de la pièce qui facilite le réglage de l'**angle d'onglet**

3.117
capacité de sciage vertical
hauteur maximale au-dessus du **plateau de la table** (épaisseur) d'une pièce de section rectangulaire dont la largeur est égale à la **capacité de sciage horizontal**, qui peut être entièrement coupée par un passage unique de la lame de scie

4 Exigences générales

L'article de la Partie 1 s'applique, avec l'exception suivante:

4.101 Dans toute la partie restante du présent document, sauf indication contraire explicite, dès lors qu'une exigence est apportée ou qu'il est fait référence à

– la “lame de scie”:

  cela doit s'appliquer également à toute “lame de scie”, comme cela est spécifié conformément à 8.14.2 a);

– la “force” comme multiple de ***D***:

  la force doit être exprimée en newtons (N) et le diamètre de la lame de scie ***D*** doit être exprimé en millimètres (mm).

5 Conditions générales d'essai

L'article de la Partie 1 s'applique, avec les exceptions suivantes:

5.17 *Addition:*

*L'ensemble de l'outillage doit comprendre les **guides** et le ou les presseurs exigés conformément à 21.103 et 21.104. Les parties supplémentaires telles que les chariots exigés conformément aux instructions d'utilisation sûre de l'outillage doivent faire partie de l'ensemble.*

5.101 Procédure de détermination de la capacité de sciage horizontal

*La **scie à onglets** est équipée d'un disque en acier d'une épaisseur de (2 ± 0,2) mm et de diamètre **D** en lieu et place de la lame de scie et est réglée à un **angle de biseau** de 0°. L'**outil de coupe** est à sa **position d'arrêt complet** et, pour une **scie à onglets** avec fonction coulissante, ce même **outil de coupe** est à sa position horizontale étendue maximale par rapport au **guide**. La **scie à onglets** est réglée pour l'**angle d'onglet** pour lequel le mesurage de la **capacité de sciage horizontal** est souhaité.*

***Capacité de sciage horizontal**:*

*La **capacité de sciage horizontal** est la distance perpendiculaire mesurée dans le plan du **plateau de la table** entre le **guide** et le point d'intersection de la périphérie du disque en acier dans le **quartier** “C” avec le plan du **plateau de la table**.*

6 Rayonnement, toxicité et dangers analogues

L'article de la Partie 1 s'applique.

7 Classification

L'article de la Partie 1 s'applique.

8 Marquage et indications

L'article de la Partie 1 s'applique, avec les exceptions suivantes:

8.1 *Addition:*

Les **scies à onglets** doivent comporter un marquage indiquant:

– la **vitesse assignée à vide** de l'arbre de sortie.

8.3 *Addition:*

Les **scies à onglets** doivent comporter un marquage indiquant le ou les diamètres de lame de scie. La ou les valeurs marquées ne doivent pas être supérieures à ***D*** et ne doivent pas être inférieures à 0,96 ***D***.

Les **scies à onglets** doivent comporter un marquage indiquant le sens de rotation de l'arbre sur un emplacement visible de l'outil à proximité de la lame de scie, tel que sur le **protecteur** de la lame de scie, au moyen d'une flèche dessinée ou taillée ou par tout autre moyen tout aussi visible et permanent.

Le **plateau de la table** de chaque côté de la lame de scie doit comporter le signe suivant:

Il n'est pas nécessaire que ce symbole corresponde aux exigences de couleur de l'ISO 3864-2.

8.14.1 *Addition:*

Les instructions de sécurité supplémentaires, comme cela est spécifié en 8.14.1.101, doivent être fournies. La présente partie peut être imprimée séparément des “Avertissements de Sécurité Généraux pour les Outils d'Alimentation”.

8.14.1.101 Instructions de sécurité pour les scies à onglets

a) **Les scies à onglets sont destinées à couper le bois ou des produits assimilés, et ne peuvent pas être utilisées avec une meule tronçonneuse pour la coupe de matériaux ferreux tels que des barres, tiges, goujons, etc**. *La poussière d'abrasif provoque le coincement des pièces mobiles telles que le protecteur inférieur. Les étincelles générées par une coupe abrasive provoquent l'inflammation du protecteur inférieur, de l'insert de saignée et des autres pièces en plastique.*

b) **Utiliser dans toute la mesure du possible des presseurs pour soutenir la pièce. En cas de soutien de la pièce à la main, il faut toujours maintenir la main à une distance d'au moins 100 mm de chaque côté de la lame de scie. Ne pas utiliser cette scie pour couper des pièces qui sont trop petites pour pouvoir être serrées en toute sécurité ou tenues à la main.** *Une main placée trop près de la lame de scie augmente le risque de blessure par contact avec la lame.*

c) **La pièce doit être fixe et serrée ou maintenue contre le guide et la table. Ne jamais avancer la pièce dans la lame ou ne jamais couper "à main levée".** *Des pièces non maintenues ou mobiles peuvent être éjectées à des vitesses élevées et provoquer de ce fait des blessures.*

d) **Scier la pièce en exerçant une poussée sur la scie. Ne pas scier la pièce en exerçant une traction sur la scie. Pour effectuer une coupe, lever la tête d'abattage et la placer au-dessus de la pièce sans la couper, lancer le moteur, appuyer sur la tête d'abattage et scier la pièce en exerçant une poussée sur la scie.** *Une opération de coupe tirante est susceptible de provoquer le déplacement de la lame de scie vers le sommet de la pièce et de propulser violemment ainsi l'assemblage de la lame vers l'opérateur.*

NOTE 1 L'avertissement ci-dessus ne s'applique pas pour une **scie à onglets** à bras pivotant simple.

e) **Ne jamais croiser la main avec la ligne de coupe prévue que ce soit devant ou derrière la lame de scie.** *Soutenir la pièce "main croisée", c'est-à-dire en maintenant la pièce du côté droit de la lame de scie avec la main gauche ou inversement, est très dangereux.*

f) **Ne pas approcher les mains de la partie arrière du guide à une distance de moins de 100 mm par rapport à chaque côté de la lame de scie, afin de retirer des copeaux de bois, ou pour toute autre raison, alors que la lame tourne.** *La proximité de la lame de scie en rotation et de la main peut ne pas être évidente et peut risquer de provoquer de graves blessures.*

g) **Examiner la pièce avant de la couper. Si la pièce est courbée ou gauchie, la serrer avec la face courbée extérieure dirigée vers le guide. Toujours veiller à l'absence d'espace entre la pièce, le guide et la table le long de la ligne de coupe.** *Les pièces pliées ou gauchies peuvent se tordre ou se décaler et peuvent entraîner un blocage de la lame de scie en rotation lors de la coupe. Il convient que la pièce ne comporte aucun clou ni aucun corps étranger.*

h) **Ne pas utiliser la scie tant que la table n'est pas dégagée de tous les outils, copeaux de bois, etc., à l'exception de la pièce.** *Les petits débris, les morceaux de bois détachés ou d'autres objets en contact avec la lame en rotation peuvent être éjectés avec une vitesse élevée.*

i) **Ne couper qu'une seule pièce à la fois.** *Plusieurs pièces empilées ne peuvent être serrées ou entourées de manière appropriée et peuvent bloquer la lame ou se décaler lors de la coupe.*

j) **Vérifier que la scie à onglets est montée ou placée sur une surface de travail solide de niveau avant utilisation.** *Une surface de travail solide de niveau réduit le risque d'instabilité de la scie à onglets.*

k) **Planifier votre travail. À chaque changement de réglage de l'angle de biseau ou d'onglet, veiller à ce que le guide réglable soit réglé correctement afin de soutenir la pièce, et n'affecte pas la lame ou le système de protection.** *Sans mettre l'outil en position "MARCHE" et sans aucune pièce placée sur la table, déplacer la lame de scie en simulant une coupe complète afin d'assurer l'absence de tout obstacle ou de tout risque de sectionnement du guide.*

NOTE 2 La phrase "l'angle de biseau ou" ne s'applique pas aux scies sans réglage de l'angle de biseau.

l) **Prévoir un support approprié tel que des rallonges de table, des chevalets de sciage, etc. pour une pièce plus large ou plus longue que le plateau de la table**. *Des pièces plus longues ou plus larges que la table de la scie à onglets peuvent basculer si elles ne sont pas soutenues de manière sûre. Un basculement de la pièce coupée ou de la pièce à couper peut soulever le protecteur inférieur ou la pièce coupée ou à couper peut être éjectée par la lame en rotation.*

m) **Ne pas demander à une tierce personne de servir de rallonge de table ou de support supplémentaire.** *Un support instable de la pièce peut entraîner le blocage de la lame ou le décalage de la pièce lors de la coupe, vous entraînant, de même que l'assistant, dans la lame en rotation.*

n) **La pièce coupée ne doit pas être coincée ou comprimée par quelque moyen que ce soit contre la lame de scie en rotation.** *Si elle devait être enserrée, c'est-à-dire à l'aide de butées longitudinales, la pièce coupée pourrait être coincée contre la lame et être éjectée violemment.*

o) **Toujours utiliser un presseur ou un appareil de serrage conçu pour soutenir correctement tout matériau rond tel que des tiges ou des tubes.** *Les tiges ont tendance à rouler lors de leur coupe, ce qui provoque une "action de morsure" de la lame et entraîne la pièce et la main dans ladite lame.*

p) **Laisser la lame atteindre sa vitesse maximale avant qu'elle n'entre en contact avec la pièce.** *Cela réduit le risque d'éjection de la pièce.*

q) **Lorsque la pièce ou la lame est coincée, mettre la scie à onglets en position arrêt. Attendre l'arrêt complet de toutes les parties mobiles et débrancher la prise de la source d'alimentation et/ou retirer le bloc-piles. Libérer ensuite le matériau coincé.** *Un sciage continu avec une pièce coincée peut entraîner une perte de contrôle ou endommager la scie à onglets.*

r) **Dès lors que la coupe est achevée, relâcher l'interrupteur de puissance, abaisser la tête d'abattage et attendre l'arrêt de la lame avant de retirer la pièce coupée.** *Il est dangereux d'approcher la main de la lame qui continue de tourner.*

s) **Maintenir la poignée fermement lors de la réalisation d'une coupe incomplète ou lors du relâchement de l'interrupteur de puissance avant que la tête d'abattage ne soit totalement à l'arrêt.** *Le freinage de la scie peut provoquer une saccade descendante de la tête d'abattage, entraînant de ce fait un risque de blessure.*

NOTE 3 L'avertissement ci-dessus s'applique uniquement aux **scies à onglets** avec système de freinage.

8.14.2 a)

101) Instructions pour identifier la lame de scie correcte à utiliser pour le matériau à couper;

102) Informations relatives aux capacités de sciage;

103) Informations relatives aux réglages de l'**angle de biseau** maximal et de **l'angle d'onglet** maximal, le cas échéant;

104) Instructions pour n'utiliser qu'un seul diamètre de lame de scie conforme aux marquages sur la scie et aux informations concernant le diamètre d'alésage et la largeur de **trait de scie** maximale de la lame;

105) Instructions pour n'utiliser que des lames de scie dont le marquage indique une vitesse égale ou supérieure à la vitesse indiquée sur l'outil;

106) Instructions relatives au remplacement de la lame de scie, y compris l'installation correcte de la lame de scie;

107) Instructions relatives au réglage de la scie pour une capacité de sciage correcte, le cas échéant;

108) Instructions pour utiliser correctement le ou les appareils de réglage et le ou les appareils de verrouillage pour la butée de profondeur de coupe de la lame de scie, l'**angle d'onglet** et **l'angle de biseau**, le cas échéant;

109) Instructions pour aligner le **guide**, le cas échéant;

110) Instructions pour vérifier si les **protecteurs** de lame de scie fonctionnent correctement;

111) Instructions de branchement des dépoussiéreurs;

112) Pour les **scies à onglets** avec fonction coulissante: Instructions relatives à la séquence de coupe;

113) Instructions concernant la procédure de réglage de la profondeur de coupe de la lame de scie pour les coupes non traversantes, le cas échéant;

114) Instructions pour vérifier que la **scie à onglets** est toujours stable et protégée (par exemple, fixée sur un établi) et instructions pour fixer la scie sur un établi ou élément similaire;

115) Lorsqu'une ou des extensions du support de la pièce réglables et/ou démontables sont prévues pour satisfaire à 21.102.1: instructions pour toujours fixer et utiliser cette ou ces extensions en fonctionnement;

116) Instructions concernant l'utilisation de supports supplémentaires, si nécessaire pour assurer la stabilité de la pièce.

8.14.2 b)

101) Instructions relatives aux coupes correctes, y compris le sciage en travers, les modes opératoires de coupe pour l'**angle d'onglet** et l'**angle de biseau**, le cas échéant;

102) Instructions concernant les modes opératoires des seules coupes non traversantes tels que le rainurage/entaillage;

103) Informations relatives aux matériaux qui peuvent être sciés. Instructions pour éviter une surchauffe des sommets de dents de la lame de scie et, si le sciage du plastique est permis, pour éviter la fonte du plastique;

104) Instructions pour une utilisation correcte de l'appareil de serrage de la pièce;

105) Lorsque la scie est équipée d'une **plaque de saignée** interchangeable: instructions pour retirer et installer la **plaque de saignée** et pour régler sa hauteur par rapport au **plateau de la table**, le cas échéant. Instructions pour remplacer une **plaque de saignée** usagée;

106) Instructions et mode opératoire utilisés pour découper une encoche dans une **plaque de saignée** intégrée, le cas échéant;

107) Instructions concernant la manutention et le support de la **scie à onglets** lors du transport.

108) Instructions pour éviter une libération incontrôlée de l'**outil de coupe** à partir de la **position d'arrêt complet**.

8.14.2 c)

101) Instructions pour nettoyer correctement l'outil et le système de protection.

9 Protection contre l'accès aux parties actives

L'article de la Partie 1 s'applique.

10 Démarrage

L'article de la Partie 1 s'applique.

11 Puissance et courant

L'article de la Partie 1 s'applique.

12 Échauffements

L'article de la Partie 1 s'applique.

13 Résistance à la chaleur et au feu

L'article de la Partie 1 s'applique.

14 Résistance à l'humidité

L'article de la Partie 1 s'applique.

15 Protection contre la rouille

L'article de la Partie 1 s'applique.

16 Protection contre la surcharge des transformateurs et des circuits associés

L'article de la Partie 1 s'applique.

17 Endurance

L'article de la Partie 1 s'applique.

18 Fonctionnement anormal

L'article de la Partie 1 s'applique, avec l'exception suivante:

18.8 *Remplacement du Tableau 4:*

Tableau 4 – Niveaux de performance exigés

Type et objectif de la SCF	Niveau de performance minimal (PL)
Interrupteur de puissance – prévient une mise en service involontaire	Doit être évalué à l'aide des conditions de défaut décrites en 18.6.1 sans perte de cette **fonction critique de sécurité**
Interrupteur de puissance – permet un arrêt volontaire	Doit être évalué à l'aide des conditions de défaut décrites en 18.6.1 sans perte de cette **fonction critique de sécurité**
Permet le sens de rotation souhaité	Doit être évalué à l'aide des conditions de défaut décrites en 18.6.1 sans perte de cette **fonction critique de sécurité**
Toute commande électronique visant à satisfaire à l'essai de 18.3	c
Prévenir la survitesse pour empêcher la vitesse de sortie de dépasser 130 % de la **vitesse à vide assignée**	c
Prévoir un temps d'arrêt comme exigé en 19.103	a
Fonction de verrouillage conformément à 21.18.2.101	b
Protecteur inférieur – prévient le retrait ou la libération indésirable du dispositif de verrouillage	c
Éviter de dépasser les limites thermiques spécifiées à l'Article 18	a

19 Dangers mécaniques

L'article de la Partie 1 s'applique, avec les exceptions suivantes:

19.1 *Remplacement du premier alinéa:*

Les parties mobiles et dangereuses autres que la lame de scie en rotation doivent être disposées ou protégées de manière à assurer une protection appropriée contre les blessures. La protection de la lame en rotation est couverte en 19.101.

19.3 *Remplacement:*

Il ne doit pas être possible d'atteindre des parties mobiles dangereuses à travers les ouvertures du dépoussiéreur lorsque les **parties amovibles** ou les appareils prévus pour le dépoussiérage sont retirés, s'ils existent.

La conformité est vérifiée par l'essai suivant.

Pour les ouvertures du dépoussiéreur, le calibre d'essai B décrit dans l'IEC 61032 est utilisé. Le calibre d'essai est inséré avec une force ne dépassant pas 5 N dans l'ouverture du dépoussiéreur jusqu'à ce que l'appareil d'arrêt du calibre d'essai soit face à l'ouverture du dépoussiéreur et ne doit pas être en contact avec des parties mobiles dangereuses.

19.7.101 Une **scie à onglets** doit être conçue de manière à ne pas pouvoir basculer pendant l'utilisation lorsque l'**outil de coupe** est libéré par inadvertance à partir de sa **position d'arrêt complet.**

*La conformité est vérifiée par l'essai 1 et l'essai 2, le cas échéant. L'essai 2 s'applique uniquement si la **scie à onglets** comporte un socle fourni, soit avec l'outil, soit identifié de manière spécifique conformément à 8.14.2. Pour les deux essais, la **scie à onglets** est réglée à un **angle de biseau** de 0° et l'essai est réalisé à un angle de 0° et aux réglages de l'**angle d'onglet** maximal. Pour les **scies à onglets** à action coulissante, les essais sont réalisés avec l'**outil de coupe** à sa position d'extension maximale et d'extension minimale par rapport au **guide**. Si possible, le mécanisme coulissant est verrouillé dans la position correspondante. L'outil est assemblé conformément à 8.14.2 a) 2) et est équipé d'un disque en acier de (2 ±0,2 mm) de diamètre **D**.*

1) *La **scie à onglets**, sans socle et sans être fixée à la surface d'appui, est placée sur un panneau horizontal de fibres à densité moyenne (MDF – medium density fibreboard) comprise entre 650 kg/m^3 et 850 kg/m^3. Une pièce en panneau de fibres à densité moyenne ayant la même densité que spécifiée ci-dessus, une épaisseur de (20 ± 2) mm, une largeur de 50 % de la **capacité de sciage horizontal** et une longueur égale à la longueur du **plateau de la table** comme exigé en 21.102 et une division par une **largeur de trait de scie** adaptée à la lame de scie, est placée contre le **guide** et l'**outil de coupe** effectue un mouvement descendant jusqu'à sa **position d'arrêt complet**, et la poignée est alors relâchée. La **scie à onglets** ne doit pas basculer.*
2) *L'essai est répété avec la **scie à onglets** montée sur le socle. La **scie à onglets**/le socle ne doivent pas basculer.*

19.7.102 Les **scies à onglets** doivent être équipées de moyens destinés à faciliter leur fixation sur un établi, par exemple en prévoyant des orifices dans le socle.

La conformité est vérifiée par examen.

19.8 Ce paragraphe de la Partie 1 s'applique.

19.101 Protecteurs de lame de scie

19.101.1 Pour réduire le danger de tout contact fortuit avec la lame de scie, la **scie à onglets** doit être équipée d'un système de protection combinant un **protecteur** supérieur et un **protecteur** inférieur.