UL 62841-3-9

STANDARD FOR SAFETY

Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-9: Particular Requirements For Transportable Mitre Saws

UL Standard for Safety for Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-9: Particular Requirements For Transportable Mitre SawsUL 62841-3-9

First Edition, Dated January 13, 2016

Summary of Topics

The revision pages dated April 28, 2017 are being issued to incorporate the following and to reflect the latest ANSI approval date.

1. Addition Of Clause 1DV To Modify The Scope Of The Standard By Specifying A 400 mm Saw Blade Diameter

2. Revision To Table 4, Required Performance Levels, And Deletion Of Table 4DV To Align With Changes In IEC Corrigendum 1 Of IEC 62841-3-9

3. Revision To The Marking Requirements in Clause 8.3 To Align With Changes In IEC Corrigendum 2 Of IEC 62841-3-9

Please note that the national difference document incorporates all of the U.S. national differences for UL 60745-3-9 including the changes to national differences itemized above. This standard is an adoption of IEC UL 62841-3-9, Edition 1 published by the IEC August 2014.

The new requirements are substantially in accordance with Proposal(s) on this subject dated January 27, 2017.

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First Edition
(IEC 62841-3-9:2014, MOD)

Underwriters Laboratories Inc.
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First Edition

Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-9: Particular Requirements For Transportable Mitre Saws

January 13, 2016

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This national standard is based on publication IEC 62841-3-9, First Edition (2014).

ANSI/UL 62841-3-9-2017

Approved by

Standards Council of Canada
Conseil canadien des normes

Commitment for Amendments

This standard is issued jointly by the Canadian Standards Association (operating as "CSA Group"), and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to CSA Group, or UL at anytime. Revisions to this standard will be made only after processing according to the standards development procedures of CSA Group and UL. CSA Group and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue.

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This Standard is subject to review five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquires@csagroup.org and include "Proposal for change" in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

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This ANSI/UL Standard for Safety consists of the First Edition including revisions through April 28, 2017. The most recent designation of ANSI/UL 62841-3-9 as an American National Standard (ANSI) occurred on April 28, 2017. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

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Preface

This is the harmonized CSA Group and UL Standard for Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-9: Particular Requirements For Transportable Mitre Saws. It is the First edition of CAN/CSA-C22.2 No. 62841-3-9 and the First edition of UL 62841-3-9. This harmonized Standard has been jointly revised on April 28, 2017. For this purpose, CSA Group and UL are issuing revision pages dated April 28, 2017.

This harmonized standard is based on IEC Publication 62841-3-9: edition 1, Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-9: Particular Requirements For Transportable Mitre Saws issued 8-2014. IEC publication 62841-3-9 is copyrighted by the IEC.

This harmonized standard was prepared by CSA Group and Underwriters Laboratories Inc. (UL). The efforts and support of the International Harmonization Committee adoption of the IEC series of standards for Hand-Held, Motor-Operated, and Transportable Tools and Lawn and Garden Machinery are gratefully acknowledged.

This standard is considered suitable for use for conformity assessment within the stated scope of the standard.

This standard was reviewed by the CSA Subcommittee on Safety of Hand-Held Motor-Operated Electric Tools, under the jurisdiction of the CSA Technical Committee on Consumer and Commercial Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee.

This standard has been approved as a National Standard of Canada by the Standards Council of Canada (SCC).

This standard has been approved by the American National Standards Institute (ANSI) as an American National Standard.

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

This CAN/CSA-C22.2 No. 62841-3-9 Standard for Safety for Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-9: Particular Requirements For Transportable Mitre Saws is to be used in conjunction with the First edition of CAN/CSA-C22.2 No. 62841-1. The requirements for transportable mitre saws are contained in this Part 3 Standard and CAN/CSA-C22.2 No. 62841-1. Requirements of this Part 3 Standard, where stated, amend the requirements of CAN/CSA-C22.2 No. 62841-1. Where a particular subclause of CAN/CSA-C22.2 No. 62841-1 is not mentioned in CAN/CSA-C22.2 No. 62841-3-9, the CAN/CSA-C22.2 No. 62841-1 subclause applies.

This UL Standard 62841-3-9 Standard for Safety for Standard for Safety for Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-9: Particular Requirements For Transportable Mitre Saws, is to be used in conjunction with the First edition of UL

62841-1. The requirements for transportable mitre saws are contained in this Part 3 Standard and UL 62841-1. Requirements of this Part 3 Standard, where stated, amend the requirements of UL 62841-1. Where a particular subclause of UL 62841-1 is not mentioned in UL 62841-3-9, the UL 62841-1 subclause applies.

Level of Harmonization

This standard adopts the IEC text with national differences.

This standard is published as an equivalent standard for CSA Group and UL.

An equivalent standard is a standard that is substantially the same in technical content, except as follows: Technical national differences are allowed for codes and governmental regulations as well as those recognized as being in accordance with NAFTA Article 905, for example, because of fundamental climatic, geographical, technological, or infrastructural factors, scientific justification, or the level of protection that the country considers appropriate. Presentation is word for word except for editorial changes.

All national differences from the IEC text are included in the CSA Group and UL versions of the standard. While the technical content is the same in each organization's version, the format and presentation may differ.

Reasons for Differences From IEC

National differences from the IEC are being added in order to address safety and regulatory situations present in the US and Canada.

Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

IEC Copyright

For CSA Group, the text, figures, and tables of International Electrotechnical Commission Publication IEC 62841-3-9, Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-9: Particular Requirements For Transportable Mitre Saws, copyright 2014, are used in this standard with the consent of the International Electrotechnical Commission. The IEC Foreword is not a part of the requirements of this standard but is included for information purposes only.

For UL, the text, figures and tables of IEC publication IEC 62841-3-9, Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-9: Particular Requirements For Transportable Mitre Saws, copyright 2014 are used in this standard with the consent of the IEC and the American National Standards Institute (ANSI). The IEC copyrighted material has been reproduced with permission from ANSI. ANSI should be contacted regarding the reproduction of any portion of the IEC material. The IEC Foreword and Introduction are not a part of the requirements of this standard but are included for information purposes only. Copies of IEC Publication IEC 62841-3-9 may be purchased from ANSI, 25 West 43rd Street, 4th Floor, New York, New York, 10036, (212) 642- 4900.

NATIONAL DIFFERENCES

National Differences from the text of the International Electrotechnical Commission (IEC) publication 62841-3-9 (Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-9: Particular Requirements For Transportable Mitre Saws) are indicated by the following notation:

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **national regulatory requirements**.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

D2 – These are national differences from IEC requirements based on existing **safety practices**. These requirements reflect national safety practices, where empirical substantiation (for the IEC or national requirement) is not available or the text has not been included in the IEC standard.

DC – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE – These are National Differences based on **editorial comments or corrections**.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add – An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Modification / Modify – A modification is an altering of the existing base IEC text such as the addition, replacement, or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

Deletion / Delete – A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRIC MOTOR-OPERATED HAND-HELD TOOLS, TRANSPORTABLE TOOLS AND LAWN AND GARDEN MACHINERY – SAFETY – PART 3-9: PARTICULAR REQUIREMENTS FOR TRANSPORTABLE MITRE SAWS

FOREWORD

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 nongovernmental 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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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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

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

FDIS	Report on voting
116/181/FDIS	116/192/RVD

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

This 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 first edition of 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 smaller 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.

101DV DE *Modification: Add the following to the IEC Foreword:*

The numbering system in the standard uses a space instead of a comma to indicate thousands and uses a comma instead of a period to indicate a decimal point. For example, 1 000 means 1,000 and 1,01 means 1.01.

102DV DE *Modification: Add the following to IEC Foreword:*

For this Standard, all references to the "Part 1" refer to CAN/CSA-C22.2 No. 62841-1 and UL 62841-1.

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 mm, which hereinafter might simply be referred to as saw or tool.

This standard does not apply to **mitre saws** intended to cut other metals, such as magnesium, steel and iron. This standard 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 standard 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 standard 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.

1DV D2 ***Modification: Replace the first paragraph of Clause 1 of the Part 3 with the following:***

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 400 mm, which hereinafter might simply be referred to as saw or tool.

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

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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 as illustrated in Figure 109 that has a face supporting the workpiece in conjunction with the **fence**

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: 5.101 provides a measurement procedure for horizontal cutting capacity.

3.108 **kerf:** 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 101.

3.112 **quadrants (of the saw blade):** with the **saw unit** in the **fully down position**, 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 102):

- **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.**

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 101.

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 21.104. 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 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.

8.2DV.1 D1 ***Modification: Add the following to Subclause 8.2 of the Part 1:***

Tools shall be marked with the following additional safety warnings:

– WARNING – "Wear eye protection" or the sign M004 of ISO 7010.

– WARNING – Keep hands and body out of the path of the saw blade. Contact with blade will result in serious injury.

– WARNING – Check guarding system to make sure it is functioning correctly.

– WARNING – Do not perform any operation freehand.

– WARNING – Never reach around saw blade (or "Never reach in back of saw blade").

– WARNING – Turn off tool and wait for saw blade to stop before moving workpiece or changing settings.

8.2DV.2 D1 ***Modification: Add the following to Subclause 8.2 of the Part 1:***

A mitre saw with a manually actuated lower blade guard as noted in 19.101.4 shall be marked with the following:

– WARNING – Release lower guard retraction mechanism after each cut.

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 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 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 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** 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.

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
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

Table 4DV deleted April 28, 2017.

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.

*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 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 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** 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.

19.101 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 102. 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 102. 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 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 103. 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 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.*

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 104. 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 mm thick steel disc of diameter **D** fitted to the **mitre saw** in place of the saw blade.*

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 the teeth of the saw blade in the **quadrant** *"C"*.

Compliance is checked by inspection and by the following test applying the test probe of Figure 105.

*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**. The test probe shall not touch the periphery of a 2 mm thick steel disc of diameter **D** fitted to the **mitre saw** in place of the saw blade.*

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** in accordance with 8.14.2 a) 104) is set to 0° **mitre angle** and 0° **bevel angle**. The adjustment in accordance 8.14.2 a) 108) is made to produce the lowest possible position of the **saw unit**. The saw is then operated and the **saw unit** moved 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 105, 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 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 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 it's **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 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 clause 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 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 for the saw blade shall be manufactured from any of the following:

a) metal having the following characteristics:

Ultimate tensile strength	Minimum thickness
N/mm^2	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.

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 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 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 **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.

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 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.*

21.102.1DV D2 *Modification: Replace the third paragraph of Subclause 21.102.1 of the Part 3 with the following:*

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 maximum mitre angle setting corresponding to the relevant mitre side of the saw blade and evaluated at location 3 in Figure 106.

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 of the **fence**(s) adjacent to the cutting line shall be either adjustable or profiled as necessary to allow the saw blade, flange, guard, 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:

– 3/4 ***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 of the steel disc periphery in **quadrant** *"C"* 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 107.

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 108), between the closest point of the adjustable or profiled **fence** on each side and the surface of a 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 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 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.*

21.103.2 **Centre workpiece support**

If a **centre workpiece support** is provided, as illustrated in Figure 109, 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** 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

21.104.1 **Mitre 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/mm^2.

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 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 110, 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.

22 Internal wiring

This clause of Part 1 is applicable.

23 Components

This clause of Part 1 is 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.

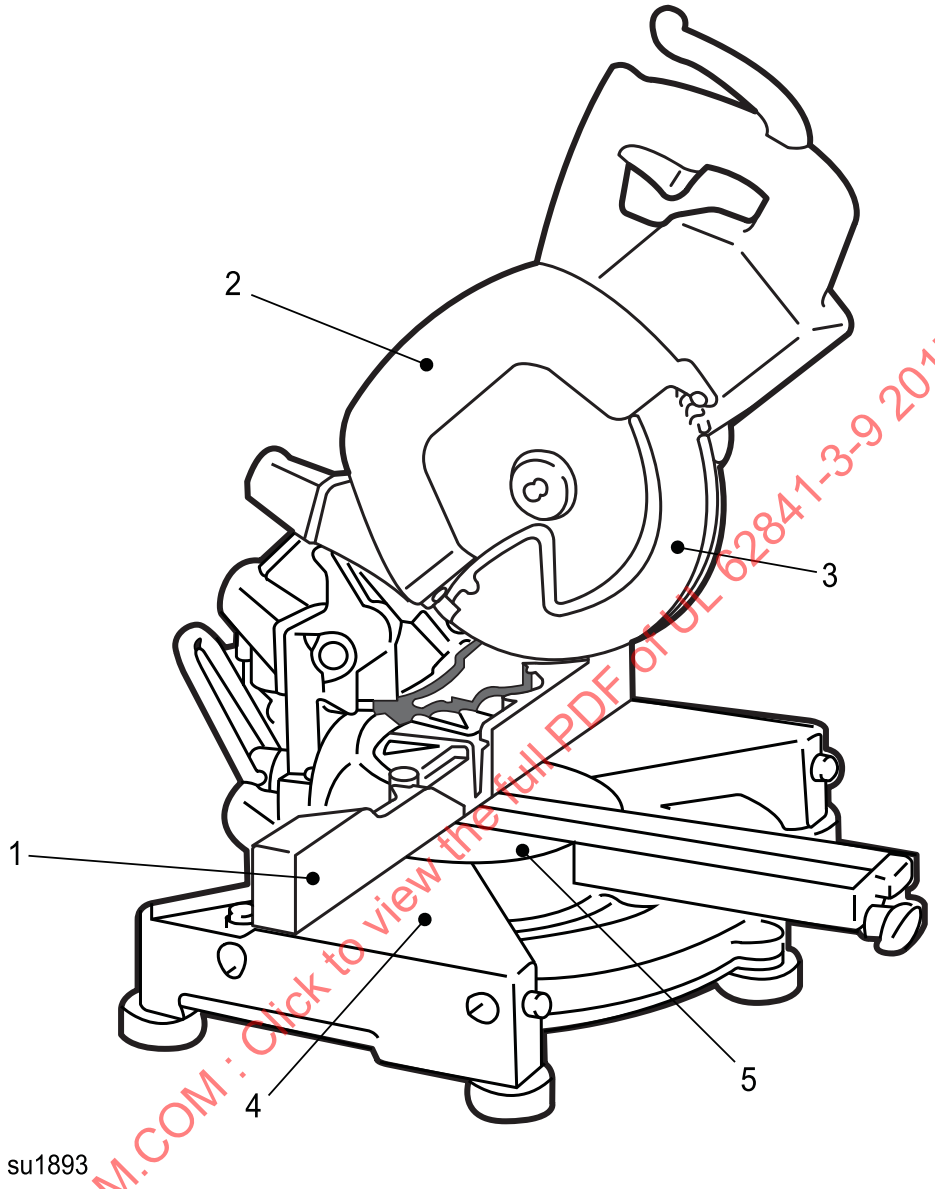
27 Screws and connections

This clause of Part 1 is applicable.

28 Creepage distances, clearances and distances through insulation

This clause of Part 1 is applicable.

Figure 101 – Mitre saw



Key

1 **fence**

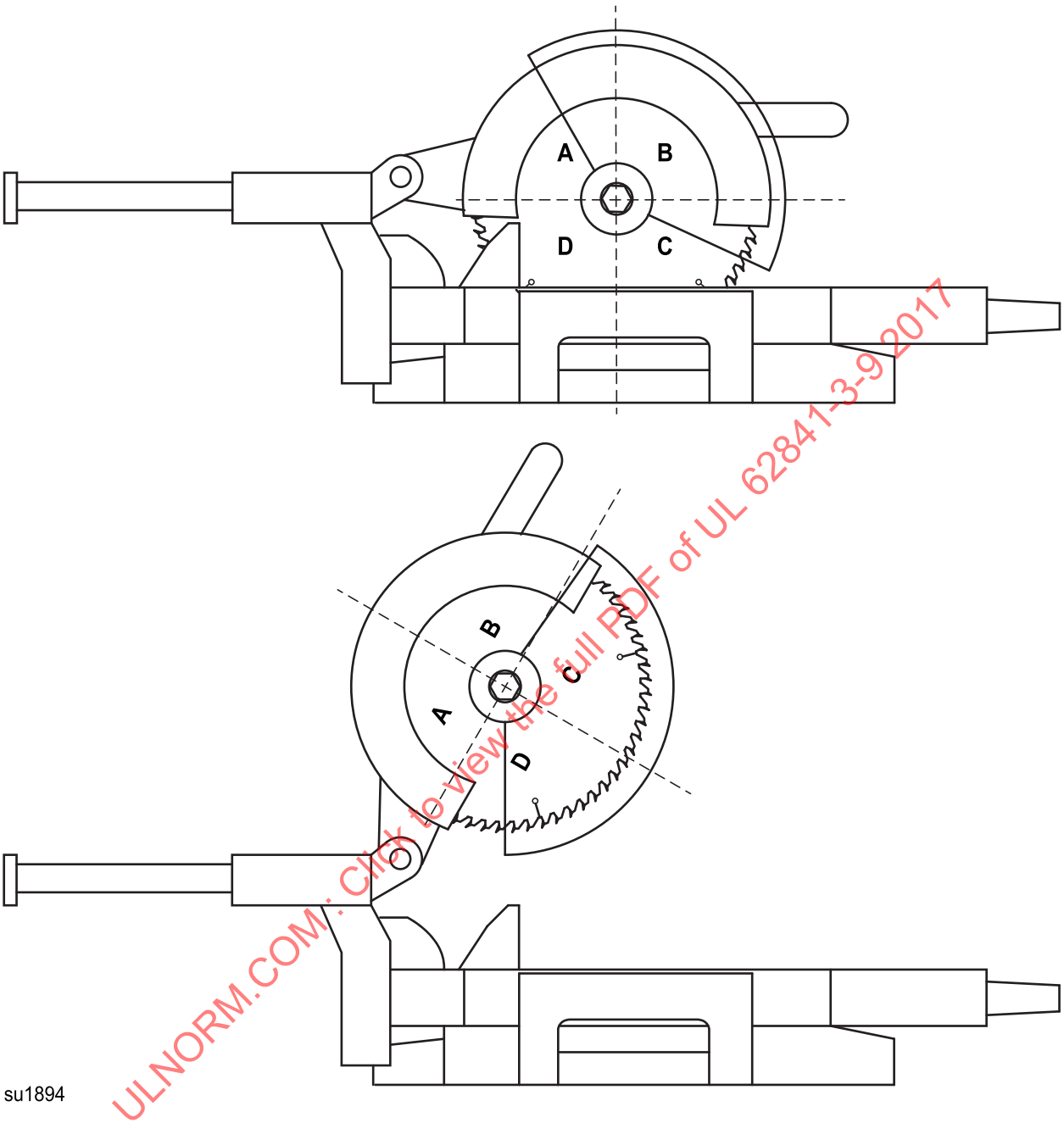
2 upper guard

3 lower guard

4 table base

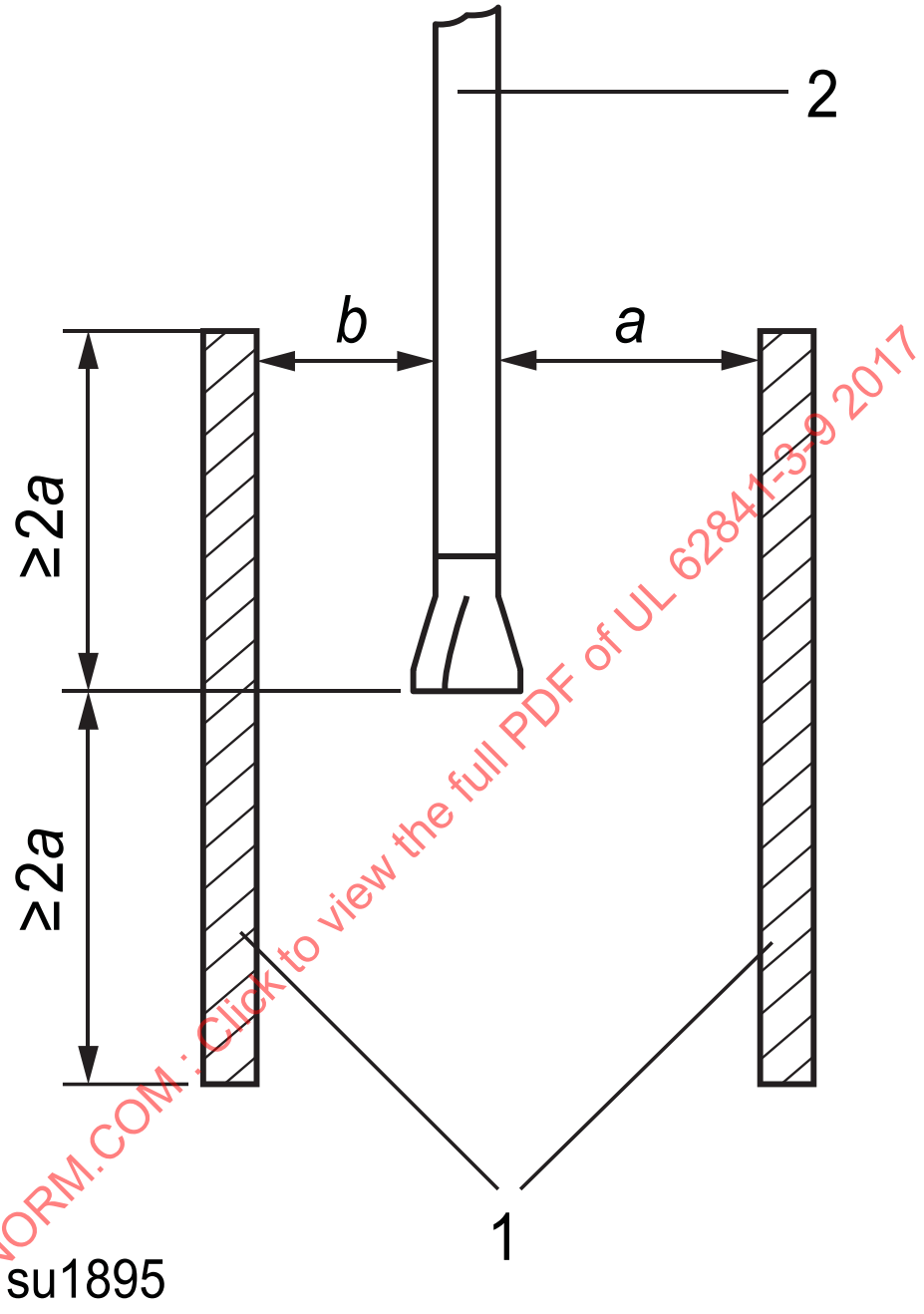
5 **turn table**

Figure 102 – Saw blade quadrants



su1894

Figure 103 – Open guard construction



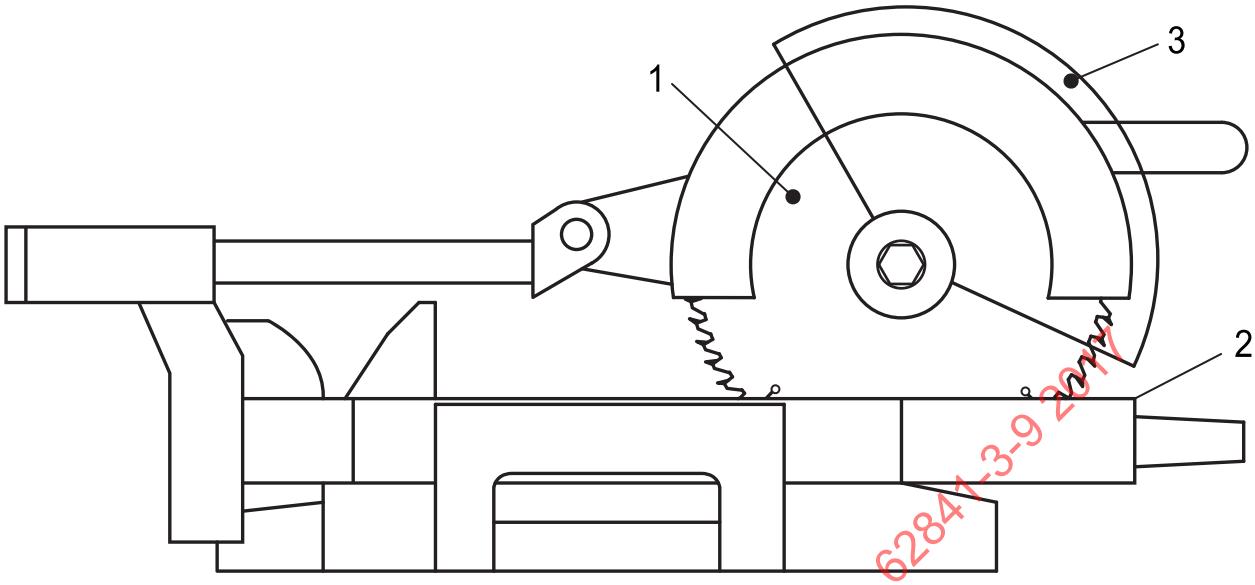
Key

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



su1896

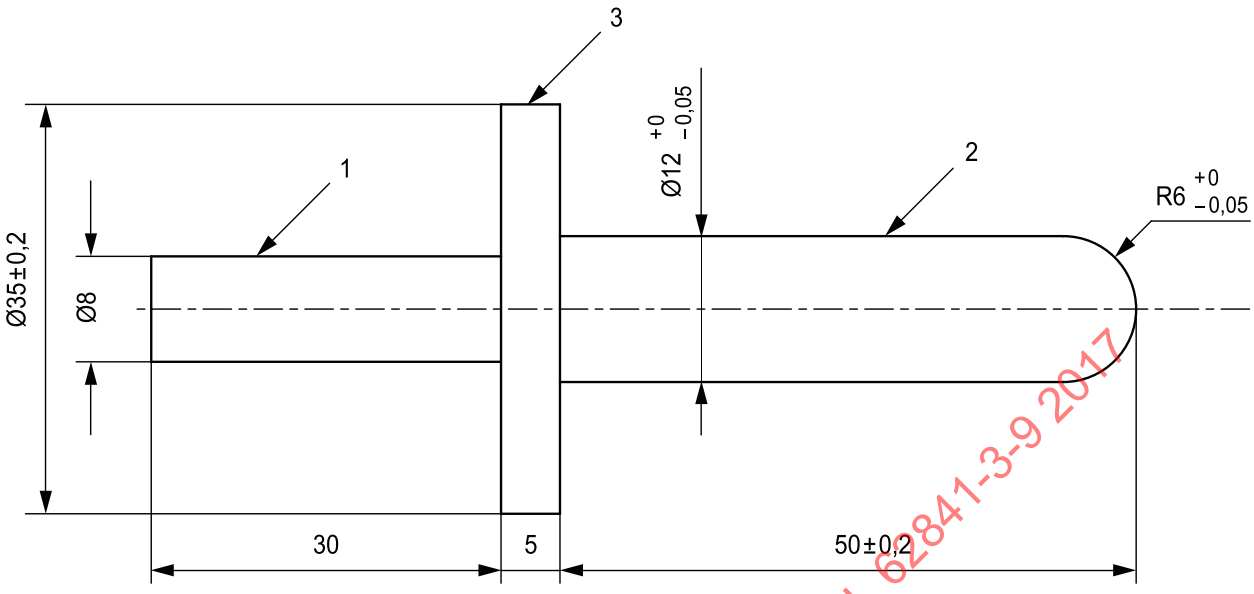
Key

1 saw blade

2 table end

3 lower guard

Figure 105 – Test probe



su0667a

Dimensions in millimetres

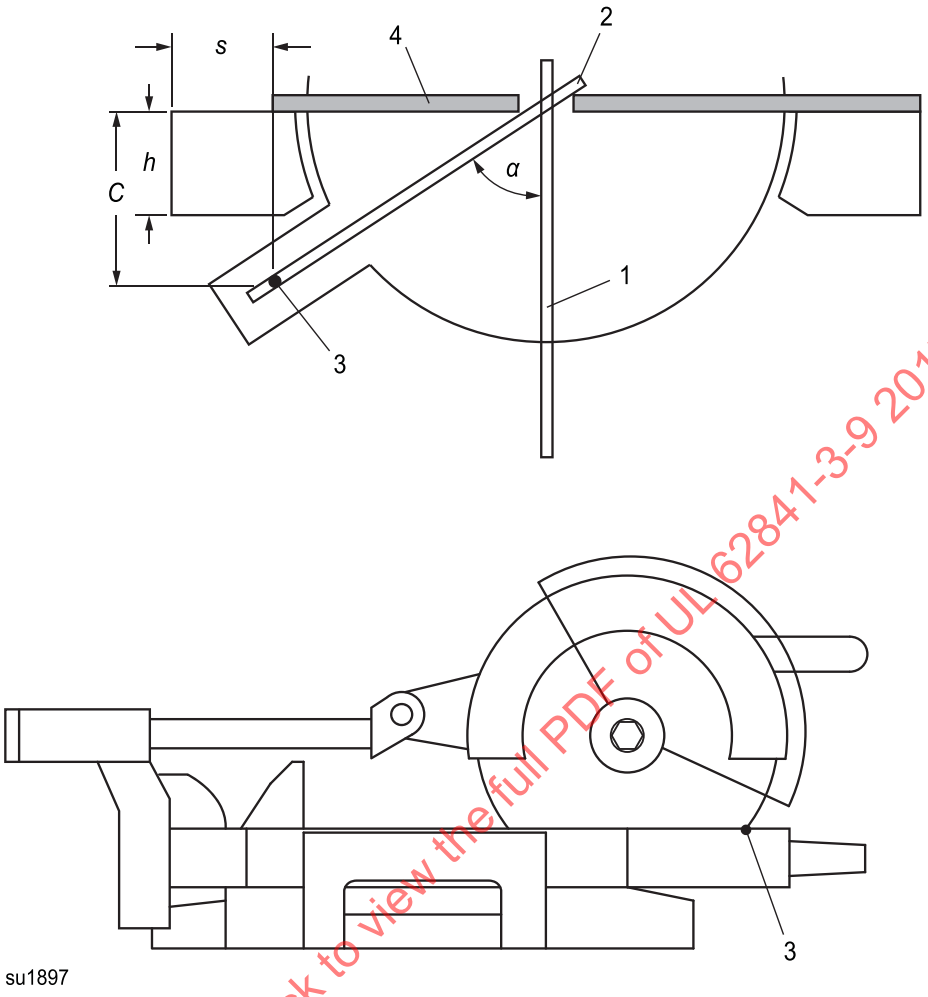
Key

1 handle section

2 test section

3 probe's flange

Figure 106 – Workpiece support dimensions



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**