62841-3-1

STANDARD FOR SAFETY

Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-1: Particular Requirements For Transportable Table Saws

UL Standard for Safety for Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Part 3-1: Particular Requirements For Transportable Table Saws, UL 62841-3-1

First Edition, Dated August 29, 2016

Summary of Topics

1. The revisions dated September 29, 2017 are being issued to incorporate changes to Clause 23 to align with changes to IEC 62841-3-1 in IEC Corrigendum 1 of IEC 62841-3-1 and to reflect the latest ANSI approval of the Standard.

This standard is an adoption of IEC 62841-3-1, Edition 1, published by the IEC June 2014. Please note that the National Difference document incorporates all of the U.S. national differences for UL 62841-3-1.

The new requirements are substantially in accordance with Proposal(s) on this subject dated June 30, 2017..

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First Edition
(IEC 62841-3-1:2014, MOD)

Underwriters Laboratories Inc.
UL 62841-3-1
First Edition

Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-1: Particular Requirements For Transportable Table Saws

August 29, 2016

(Title Page Reprinted: September 29, 2017)

This national standard is based on publication IEC 62841-3-1, First Edition (2014).

ANSI/UL 62841-3-1-2017

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 any time. 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 September 29, 2017. The most recent designation of ANSI/UL 62841-3-1 as an American National Standard (ANSI) occurred on September 29, 2017. The ANSI approval for this standard does not include the Cover Page, Transmittal Pages, Title Page, Preface Page, National Difference Page or IEC Foreword.

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Preface

This is the harmonized CSA Group and UL Standard for Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-1: Particular Requirements For Transportable Table Saws. It is the First edition of CAN/CSA-C22.2 No. 62841-3-1 and the First edition of UL 62841-3-1. This harmonized Standard has been jointly revised on September 29, 2017. For this purpose, CSA Group and UL are issuing revision pages dated September 29, 2017.

This harmonized standard is based on IEC Publication 62841-3-1: First edition, Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-1: Particular Requirements For Transportable Table Saws issued June 2014. IEC publication 62841-3-1 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 (IHC) for the adoption of the IEC series of standards for Hand-Held, Motor-Operated, and Transportable Tools and Lawn and Garden Machinery UL 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. 62841-3-1, Standard for Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-1: Particular Requirements For Transportable Table Saws is to be used in conjunction with the First edition of CAN/CSA-C22.2 No. 62841-1. The requirements for transportable table 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. 62841-3-1, the CAN/CSA-C22.2 No. 62841-1 subclause applies.

This UL 62841-3-1, Standard for Safety for Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-1: Particular Requirements For Transportable Table Saws, is to be used in conjunction with the First edition of UL 62841-1. The requirements for

transportable table 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 62841-3-1, 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 62841-3-1 Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-1: Particular Requirements For Transportable Table 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 62841-3-1, Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-1: Particular Requirements For Transportable Table 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 is not a part of the requirements of this standard but is included for information purposes only. Copies of IEC Publication IEC 62841-3-1 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 62841-3-1 (Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 3-1: Particular Requirements For Transportable Table Saws) copyright 2014 are indicated by notations (differences) and are presented in bold text. The national difference type is included in the body.

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 3-1: PARTICULAR REQUIREMENTS FOR TRANSPORTABLE TABLE 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 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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6) All users should ensure that they have the latest edition of this publication.

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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.

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International Standard IEC 62841-3-1 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
116/168/FDIS	116/182/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 3-1 is to be used in conjunction with the first edition of IEC 62841-1:2014.

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

Where a particular subclause of Part 1 is not mentioned in this Part 3-1, 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.

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 the IEC Foreword:*

For this Standard, all references to "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 3-1: PARTICULAR REQUIREMENTS FOR TRANSPORTABLE TABLE SAWS

1 Scope

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

Addition:

This part of IEC 62841 applies to transportable **table saws** with

– a toothed single blade; or

– stacked blades that cut a single groove or slot; or

– a moulding head cutter

intended for cutting wood and analogous materials, plastics and nonferrous metals except magnesium with a saw blade diameter between 105 mm and 315 mm, which hereinafter may simply be referred to as saw or tool.

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

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

NOTE 101 Saws designed for use with abrasive wheels as cut-off machines are covered by IEC 62841-3-10.

This standard does not apply to **table saws** with more than one spindle such as for a scoring blade.

NOTE 102 In Europe (EN 62841-3-1), the following conditions apply:

This standard applies to **table saws** having a mass of:

– maximum 25 kg for tools capable of being lifted by hand by one person;

– maximum 50 kg for tools capable of being lifted by hand by two persons.

This standard does not apply to stationary **table saws**.

2 Normative references

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

Addition:

ISO 180
Plastics – Determination of Izod impact strength

NOTE In Europe (EN 62841-3-1), the following normative reference applies:

EN 847-1, Tools for woodworking – Safety requirements – Part 1: Milling tools, circular saw blade

3 Terms and definitions

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

Addition:

3.101 **anti-kickback device:** device that allows the movement of the workpiece in the cutting direction but reduces the likelihood of the rapid movement of the workpiece in the direction opposite of feed

3.102 **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

3.103 **cross cutting:** any cutting operation performed utilizing a **cross-cutting fence** to guide the workpiece.

Note 1 to entry: For natural wood, a cross cut is performed predominantly in a perpendicular direction with the grain of the wood; for engineered materials, a cross cut is performed perpendicular to the length of the workpiece.

3.104 **cutting capacity:** for any depth setting of the saw blade at 0° bevel position, the height of the highest saw blade tooth tip above the **table top**

Note 1 to entry: For any depth setting of the saw blade, at **bevel angles** other than 0°, the height of the highest saw blade tooth tip above the **table top**, but only the side of the tooth closest to the table is considered.

3.104.1 **maximum cutting capacity: cutting capacity** at the maximum depth setting of the saw blade and, unless otherwise specified, at 0° bevel

3.105 **cutting edge zone:** the outer 20 % of the radius of the saw blade

3.106 ***D:*** specified diameter of the saw blade

3.107 **dadoing: non-through cutting** operation performed with a stack of specially designed saw blades of a desired thickness to produce a rectangular sided slot in the workpiece

3.108 **fence:** device to guide or position the workpiece during the cutting process

3.108.1 **cross-cutting fence: fence** that is designed to move parallel with the plane of the saw blade during the cutting process or to position the workpiece for a **table saw with sliding function**

Note 1 to entry: The **fence** may have provisions to adjust the workpiece guiding face laterally and may have **mitre angle** capability.

Note 2 to entry: A **cross-cutting fence** with **mitre angle** capability is also known as a mitreing **fence** or mitre gauge.

3.108.2 **rip fence:** fence that has the workpiece guiding face parallel with the plane of the saw blade and can be set to a desired distance from the saw blade

3.109 **grooving:** series of repeated non-through cuts of same or different depth and spacing from each other, performed with an ordinary saw blade, to remove material for the purpose of creating a slot or for shaping or bending the workpiece

Note 1 to entry: Grooving is also known as slotting or kerfing.

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

3.111 **kickback:** sudden reaction to a pinched, jammed or misaligned workpiece with respect to the saw blade, which causes the workpiece to be propelled by the saw blade

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

3.113 **moulding head cutting: non-through cutting** operation performed with a specially shaped cutting device which produces a corresponding shape of the cutter on the bottom surface of the workpiece, predominantly used for decoration

Note 1 to entry: Moulding head cutting is also known as shaping.

3.114 **non-removable (device):** device that is welded, riveted or utilizing non-standard simple fasteners and cannot be removed with ordinary household tools, such as slotted or Philips-tip screwdrivers and/or simple wrenches

3.115 **non-through cutting:** any cutting operation where the cutting device does not protrude beyond the thickness of the workpiece

3.116 **plowing: non-through cutting** operation performed by moving a workpiece over an ordinary saw blade utilizing a special **fence** that is not parallel to the cutting line of the saw blade, and in very small increments increasing the depth of the cut after each pass to shave off large, arcing surface areas

Note 1 to entry: Plowing is also known as cove cutting.

3.117 **plunge cutting: non-through cutting** operation starting at a location other than the edge of a workpiece

Note 1 to entry: The cut is typically performed by first securing the workpiece over the stationary saw blade lowered below the **table top** and then by slowly raising the rotating saw blade into the workpiece. The saw blade can be raised to fully cut through the thickness of the workpiece before the workpiece is advanced by guiding it with a rip or **cross-cutting fence**.

3.118 **quadrant:** portion of the saw blade section above the plane of the **table top** with a perpendicular boundary line going through the centre of the saw blade

Note 1 to entry: The saw blade **quadrant** from the centre of the saw blade to the intersect point of the saw blade with the **table top** at the front of the **table saw** is called the ″front **quadrant**″, the saw blade **quadrant** at the back of the **table saw** is called the ″rear **quadrant**″. See Figure 107.

3.119 **rabbeting: non-through cutting** operation creating a rectangular notch in the edge of a workpiece where the notch is either cut by dado blades or by two non-though cuts perpendicular to each other, performed with an ordinary saw blade on the side and the bottom edge of the workpiece

Note 1 to entry: Rabbeting is also known as rebating.

3.120 **resawing:** combination of two non-through cuts performed with an ordinary saw blade in the same plane but on opposite sides of a workpiece that result in reducing the thickness of the workpiece

3.121 **rip cutting:** any cutting operation performed utilizing a **rip fence** to guide the workpiece

Note 1 to entry: For natural wood, a rip cut is performed predominantly in a parallel direction with the grain of the wood; for engineered materials, a rip cut is performed parallel with the length of the workpiece.

3.122 **riving knife:** device located behind and in the plane of the saw blade, within the **cutting capacity** of the saw blade and in a fixed proximity to the saw blade through an entire depth of cut and **bevel angle** operating range of the saw blade, with an intended function to reduce the risk of saw blade pinching and binding

3.123 **extended riving knife:** device, in all aspects identical to a **riving knife** except it extends above the **maximum cutting capacity** of the saw blade to allow the mounting of a **saw blade guard** and/or an **anti-kickback device**

3.123.1 **adjustable extended riving knife:** device designed to function at least in one position as an **extended riving knife** and in a second position as a **riving knife**

3.123.2 **fixed extended riving knife: extended riving knife** that is fixed in position

3.124 **saw blade guard:** device mounted above the table such that a workpiece will pass between the mounted device and the table, designed to minimize inadvertent blade contact by the user

3.124.1 **over-arm saw blade guard: saw blade guard** suspended from a device above the table such that the mounting structure for the **saw blade guard** is not in the workable range of the **table top** plane

3.125 **table saw:** tool with a rotating toothed saw blade that projects through a slot in a table which supports and positions the workpiece, where the workpiece is fed towards the saw blade and the motor and drive assembly for the saw blade are located below the **table top**

3.125.1 **table saw with sliding function:** tool with a rotating toothed saw blade that projects through a slot in a table which supports and positions the workpiece, where the motor and drive assembly for the saw blade are located below the **table top** and mounted to a linear carriage system capable of advancing the saw blade drive assembly and where the workpiece is held stationary with the **cross-cutting fence** while the cutting saw blade is advanced through the workpiece

Note 1 to entry: The saw blade is either returned manually or automatically. These saws have a separate lockable rip-cutting position.

Note 2 to entry: These saws are also known as pull type saws.

3.126 **table top:** surface of the saw table which is in contact with and supports the workpiece

3.127 **tapered cut:** cut performed utilizing a fixture to hold the workpiece such that the straight edge of the workpiece is not parallel to the cutting line of the saw blade

Note 1 to entry: The fixture is guided by the **rip fence**.

3.128 **through cutting:** any cutting operation where the saw blade protrudes beyond the thickness of the workpiece

3.129 **zero clearance table insert:** table insert that is manufactured without any slot for the saw blade, with the intention that the slot in the table insert will be cut after installation in the **table saw** by the actual saw blade installed in the **table saw**

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);

– ″**riving knife**″:

this shall equally apply to ″**extended riving knife**″, but not vice versa. This terminology rule does not apply to ″**riving knife** position″, i.e. the ″**riving knife** position″ cannot be substituted with an ″**extended riving knife position**″;

– ″force″ as multiple of ***D***:

the force shall be measured in N and the saw blade diameter ***D*** shall be measured in 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 **saw blade guard**, **anti-kickback device**, if any, **riving knife**, **rip fence**, **cross-cutting fence** and the push stick.*

Any additional parts such as leg sets or carrying means that are required in accordance with the user instructions shall be included in the mass.

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:*

Table saws shall be marked with:

– rated no-load speed of the output spindle.

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

The following statements shall be verbatim:

a) DANGER – Never place your hands in the vicinity or in line with the saw blade.

b) WARNING – ″Wear eye protection″ or the sign M004 of ISO 7010.

c) WARNING – Always use a properly functioning saw-blade guard, riving knife and anti-kickback device for every operation for which it can be used, including all through sawing.

d) WARNING – Use a push-stick or push-block when required.

e) WARNING – Do not perform any operation freehand.

f) WARNING – Pay particular attention to instructions on reducing risk of kickback. (or ″Know how to reduce risk of kickback.″)

g) WARNING – Never reach around or over saw blade. (or ″Never reach in back of or over saw blade.″)

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

i) WARNING – Never stand directly in line with the saw blade. Always position your body on the same side of the saw blade as the fence.

8.3 Addition:

Table saws shall be marked with:

– saw blade diameter.

8.3.101 **Table 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**, **riving knife** or a table insert, by an arrow raised or recessed or by any other means no less visible and indelible.

Compliance is checked by inspection.

8.3.102 The **riving knife** shall be permanently marked, e.g. by engraving, stamping or etching, with its thickness and, as specified in Figure 101, with the saw blade diameter ***D***, saw blade body thicknesses, and **kerf widths** that can be used with this **riving knife**.

Compliance is checked by inspection.

8.3.103 The saw blade(s) provided with the tool shall be marked with a maximum operating speed and with an arrow indicating the correct direction of rotation.

Compliance is checked by inspection.

8.3.104 Table inserts for cutting tools other than single saw blades, see 21.101.6, shall be marked as illustrated in Figure 102.

Compliance is checked by inspection.

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 table saws**

1) Guarding related warnings

a) **Keep guards in place. Guards must be in working order and be properly mounted.** *A guard that is loose, damaged, or is not functioning correctly must be repaired or replaced.*

b) **Always use saw blade guard, riving knife and anti-kickback device for every through-cutting operation.** *For through-cutting operations where the saw blade cuts completely through the thickness of the workpiece, the guard and other safety devices help reduce the risk of injury.*

NOTE 1 If an **anti-kickback device** is not provided, the phrase ″and anti-**kickback** device″ is omitted.

NOTE 2 At the manufacturer's discretion, the term ″**anti-kickback device**″ can be replaced by an appropriate term such as ″anti-**kickback** pawls″ or ″anti-**kickback** rollers″.

NOTE 3 The above warning is omitted, if the **table saw** is designed with a **non-removable fixed extended riving knife** that has a **non-removable** guarding system.

c) **Immediately reattach the guarding system after completing an operation (such as rabbeting, dadoing or resawing cuts) which requires removal of the guard, riving knife and/or anti-kickback device.** *The guard, riving knife, and anti-kickback device help to reduce the risk of injury.*

NOTE 1 The term ″**rabbeting**″ can be substituted by ″rebating″.

NOTE 2 If **dadoing** or **resawing** cuts are not permitted, the term ″**dadoing** or **resawing** cuts″ is omitted.

NOTE 3 If an **anti-kickback device** is not provided, the phrase ″**anti-kickback device**″ is omitted.

NOTE 4 At the manufacturer's discretion, the term ″**anti-kickback device**″ can be replaced by an appropriate term such as ″anti-**kickback** pawls″ or "**anti-kickback** rollers″.

NOTE 5 The above warning is omitted, if the **table saw** is designed with a **non-removable fixed extended riving knife** that has a **non-removable** guarding system.

d) **Make sure the saw blade is not contacting the guard, riving knife or the workpiece before the switch is turned on.** *Inadvertent contact of these items with the saw blade could cause a hazardous condition.*

e) **Adjust the riving knife as described in this instruction manual.** *Incorrect spacing, positioning and alignment can make the riving knife ineffective in reducing the likelihood of kickback.*

f) **For the riving knife and anti-kickback device to work, they must be engaged in the workpiece.** *The riving knife and anti-kickback device are ineffective when cutting workpieces that are too short to be engaged with the riving knife and anti-kickback device. Under these conditions a kickback cannot be prevented by the riving knife and antikickback device.*

NOTE 1 If an **anti-kickback device** is not provided, the phrase ″and **anti-kickback device**″ is omitted.

NOTE 2 At the manufacturer's discretion, the term ″**anti-kickback device**″ can be replaced by an appropriate term such as ″anti-**kickback** pawls″ or ″anti-**kickback** rollers″.

g) **Use the appropriate saw blade for the riving knife.** *For the riving knife to function properly, the saw*

blade diameter must match the appropriate riving knife and the body of the saw blade must be thinner than the thickness of the riving knife and the cutting width of the saw blade must be wider than the thickness of the riving knife.

2) Cutting procedures warnings

a) ⚠ **DANGER: Never place your fingers or hands in the vicinity or in line with the saw blade.** *A moment of inattention or a slip could direct your hand towards the saw blade and result in serious personal injury.*

b) **Feed the workpiece into the saw blade or cutter only against the direction of rotation.** *Feeding the workpiece in the same direction that the saw blade is rotating above the table may result in the workpiece, and your hand, being pulled into the saw blade.*

NOTE If cutters other than the saw blade are not permitted in accordance with 8.14.2 then "or cutter" is omitted.

c) **Never use the mitre gauge to feed the workpiece when ripping and do not use the rip fence as a length stop when cross cutting with the mitre gauge.** *Guiding the workpiece with the rip fence and the mitre gauge at the same time increases the likelihood of saw blade binding and kickback.*

d) **When ripping, always apply the workpiece feeding force between the fence and the saw blade. Use a push stick when the distance between the fence and the saw blade is less than 150 mm, and use a push block when this distance is less than 50 mm.** *"Work helping" devices will keep your hand at a safe distance from the saw blade.*

e) **Use only the push stick provided by the manufacturer or constructed in accordance with the instructions.** *This push stick provides sufficient distance of the hand from the saw blade.*

f) **Never use a damaged or cut push stick.** *A damaged push stick may break causing your hand to slip into the saw blade.*

g) **Do not perform any operation "freehand". Always use either the rip fence or the mitre gauge to position and guide the workpiece.** *"Freehand" means using your hands to support or guide the workpiece, in lieu of a rip fence or mitre gauge. Freehand sawing leads to misalignment, binding and kickback.*

h) **Never reach around or over a rotating saw blade.** *Reaching for a workpiece may lead to accidental contact with the moving saw blade.*

i) **Provide auxiliary workpiece support to the rear and/or sides of the saw table for long and/or wide workpieces to keep them level.** *A long and/or wide workpiece has a tendency to pivot on the table's edge, causing loss of control, saw blade binding and kickback.*

j) **Feed workpiece at an even pace. Do not bend or twist the workpiece. If jamming occurs, turn the tool off immediately, unplug the tool then clear the jam.** *Jamming the saw blade by the workpiece can cause kickback or stall the motor.*

k) **Do not remove pieces of cut-off material while the saw is running.** *The material may become trapped between the fence or inside the saw blade guard and the saw blade pulling your fingers into the saw blade. Turn the saw off and wait until the saw blade stops before removing material.*

l) **Use an auxiliary fence in contact with the table top when ripping workpieces less than 2 mm thick.** *A thin workpiece may wedge under the rip fence and create a kickback.*

3) Kickback causes and related warnings

Kickback is a sudden reaction of the workpiece due to a pinched, jammed saw blade or misaligned line of cut in the workpiece with respect to the saw blade or when a part of the workpiece binds between the saw blade and the **rip fence** or other fixed object.

Most frequently during **kickback**, the workpiece is lifted from the table by the rear portion of the saw blade and is propelled towards the operator.

Kickback is the result of saw misuse and/or incorrect operating procedures or conditions and can be avoided by taking proper precautions as given below.

a) **Never stand directly in line with the saw blade. Always position your body on the same side of the saw blade as the fence.** *Kickback may propel the workpiece at high velocity towards anyone standing in front and in line with the saw blade.*

b) **Never reach over or in back of the saw blade to pull or to support the workpiece.** *Accidental contact with the saw blade may occur or kickback may drag your fingers into the saw blade.*

c) **Never hold and press the workpiece that is being cut off against the rotating saw blade.** *Pressing the workpiece being cut off against the saw blade will create a binding condition and kickback.*

d) **Align the fence to be parallel with the saw blade.** *A misaligned fence will pinch the workpiece against the saw blade and create kickback.*

e) **Use a featherboard to guide the workpiece against the table and fence when making non-through cuts such as rabbeting, dadoing or resawing cuts.** *A featherboard helps to control the workpiece in the event of a kickback.*

NOTE 1 The term ″**rabbeting**″ can be substituted by ″rebating″.

NOTE 2 If **dadoing** or **resawing** cuts are not permitted, the term ″**dadoing** or **resawing** cuts″ is omitted.

NOTE 3 The above warning is omitted, if the **table saw** is designed with a **non-removable fixed extended riving knife** that has a **non-removable** saw blade guard.

f) **Use extra caution when making a cut into blind areas of assembled workpieces.** *The protruding saw blade may cut objects that can cause kickback.*

NOTE The above safety warning only applies to tools where such cuts are permitted by design and instruction.

g) **Support large panels to minimise the risk of saw blade pinching and kickback.** *Large panels tend to sag under their own weight. Support(s) must be placed under all portions of the panel overhanging the table top.*

h) **Use extra caution when cutting a workpiece that is twisted, knotted, warped or does not have a straight edge to guide it with a mitre gauge or along the fence.** *A warped, knotted, or twisted workpiece is unstable and causes misalignment of the kerf with the saw blade, binding and kickback.*

i) **Never cut more than one workpiece, stacked vertically or horizontally.** *The saw blade could pick up one or more pieces and cause kickback.*

j) **When restarting the saw with the saw blade in the workpiece, centre the saw blade in the kerf so**

that the saw teeth are not engaged in the material. *If the saw blade binds, it may lift up the workpiece and cause kickback when the saw is restarted.*

k) **Keep saw blades clean, sharp, and with sufficient set. Never use warped saw blades or saw blades with cracked or broken teeth.** *Sharp and properly set saw blades minimise binding, stalling and kickback.*

4) Table saw operating procedure warnings

a) **Turn off the table saw and disconnect the power cord when removing the table insert, changing the saw blade or making adjustments to the riving knife, antikickback device or saw blade guard, and when the machine is left unattended.** *Precautionary measures will avoid accidents.*

NOTE 1 If an **anti-kickback device** is not provided, the phrase ″**anti-kickback device**″ is omitted.

NOTE 2 At the manufacturer's discretion, the term ″**anti-kickback device**″ can be replaced by an appropriate term such as ″anti-**kickback** pawls″ or ″anti-**kickback** rollers″.

b) **Never leave the table saw running unattended. Turn it off and don't leave the tool until it comes to a complete stop.** *An unattended running saw is an uncontrolled hazard.*

c) **Locate the table saw in a well-lit and level area where you can maintain good footing and balance. It should be installed in an area that provides enough room to easily handle the size of your workpiece.** *Cramped, dark areas, and uneven slippery floors invite accidents.*

d) **Frequently clean and remove sawdust from under the saw table and/or the dust collection device.** *Accumulated sawdust is combustible and may self-ignite.*

e) **The table saw must be secured.** *A table saw that is not properly secured may move or tip over.*

f) **Remove tools, wood scraps, etc. from the table before the table saw is turned on.** *Distraction or a potential jam can be dangerous.*

g) **Always use saw blades with correct size and shape (diamond versus round) of arbour holes.** *Saw blades that do not match the mounting hardware of the saw will run off-centre, causing loss of control.*

h) **Never use damaged or incorrect saw blade mounting means such as flanges, saw blade washers, bolts or nuts.** *These mounting means were specially designed for your saw, for safe operation and optimum performance.*

i) **Never stand on the table saw, do not use it as a stepping stool.** *Serious injury could occur if the tool is tipped or if the cutting tool is accidentally contacted.*

j) **Make sure that the saw blade is installed to rotate in the proper direction. Do not use grinding wheels, wire brushes, or abrasive wheels on a table saw.** *Improper saw blade installation or use of accessories not recommended may cause serious injury.*

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 **maximum cutting capacities** at zero and maximum **bevel angles**;

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 of the saw blade;

105) Information about the allowed range of **kerf width** and saw blade body thickness and instruction how to correctly match the saw blade diameter, **kerf width** and body dimensions to the **riving knife**;

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

107) Instructions for the saw blade changing procedure including proper saw blade direction installation, including instruction how to remove and install table inserts or saw blade access panels, and instruction how to adjust their height with respect to the **table top**, if applicable;

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

109) Instruction how to align the saw blade to be parallel with the guiding device used for **cross cutting** and the alignment of the **rip fence** to be parallel with the saw blade;

110) Instruction how to mount and adjust the **riving knife** or the **extended riving knife**;

111) Instruction how to use **anti-kickback devices**, if any. Also instruction how to enable and disable **anti-kickback devices**, if this feature is provided;

112) Instruction how to check that the **saw blade guard** is functioning correctly;

113) Instructions for making ″Work Helpers″ such as a push stick, auxiliary **fence**, feather boards and push block, including material and geometry, and instruction how to properly use them. Instructions for featherboards may be omitted, if the **table saw** is designed with a **non-removable fixed extended riving knife** that has a **nonremovable** guarding system;

114) Instruction how to connect dust extraction systems;

115) For **table saws** with **over-arm saw blade guard**: Instruction to adjust the **saw blade guard** to contact the **table top** and instruction to adjust the **saw blade guard** to prevent contact with the saw blade for any depth and **bevel angle** setting;

116) For **table saws with sliding function**: Instruction how to set up the saw for rip and **cross cutting** and how to adjust the **rip fence** and **cross-cutting fence**;

117) For **non-through cutting** operations only: Instructions on how and when to remove and install the guarding system components and the **anti-kickback device**, if any. Instruction how to adjust the **adjustable extended riving knife** or to exchange the **fixed extended riving knife**, as applicable.

NOTE In Europe (EN 62841-3-1), the following additional requirement applies:

Instruction to use only saw blades recommended by the manufacturer, which conform to EN 847-1, if intended for wood and analogous materials.

8.14.2 b) *Addition:*

101) Instruction on correct **through cutting** operations, including **cross cutting** and **rip cutting**, **mitre angle** and **bevel angle** cutting procedures, the use of the **cross-cutting fence** and the use of the high and low **rip fence**;

102) For **table saws** with an **extended riving knife** and a removable guarding system: instruction on simple **non-through cutting** operations of **grooving** and **rabbeting**, including the use of featherboards;

103) Instruction, whether **tapered cuts** are permissible. If applicable, instructions, to perform **tapered cuts** only with proper fixture;

104) Instruction, whether complex **non-through cutting** operations are permissible. Instructions, how to perform the permissible operations;

NOTE Examples of such operations are **plunge cutting**, **resawing**, **dadoing**, **moulding head cutting**, **plowing**.

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

106) Instruction for construction and use of an auxiliary **fence** to be in contact with the **table top** when cutting thin workpieces;

107) Instructions to avoid bevel ripping on bevelling side of the saw blade;

108) Instruction for the procedure to cut a slot in a **zero clearance table insert**, if applicable;

109) Instruction to use an RCD with the tool when mostly used to cut metal;

110) For **table saws** with an **over-arm saw blade guard**: Information about the maximum recommended width of the material that can be passed between the saw blade and the supporting structure of the **over-arm saw blade guard**;

111) Instruction to wear personal protection equipment:

– hearing protection;

– gloves when handling saw blades.

8.14.2 c) *Addition:*

101) Instruction how to properly clean the tool, the dust collection system 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 by the following:

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
Restart prevention in accordance with 21.18.2.1	b
Lock-off function as required by 21.18.2.3	b
Prevent exceeding thermal limits as in Clause 18	a
Prevent self-resetting as required in 23.3	a

19 Mechanical hazards

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

19.1 Replacement:

Protective enclosures and guards shall not be removable without the aid of a tool. This requirement does not apply to **saw blade guards**, **riving knives**, table inserts or saw blade access panels as required by 21.101.2 and to parts of the dust collection system if they have to be removed in accordance with 8.14.2 c) 101).

NOTE In Europe (EN 62841-3-1), the above paragraph is replaced by:

Protective enclosures and guards shall not be removable without the aid of a tool. This requirement does not apply to **saw blade guards**, riving knives.

Compliance is checked by inspection.

19.3 Replacement:

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

Compliance is checked by applying a test probe.

To dust collection openings below the table, the test probe B of IEC 61032:1997 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.

*Dust collection openings provided in the **saw blade guard** above the table, if any, are tested with the probe in Figure 103. The test probe is inserted with a force not exceeding 5 N into the dust collection opening until the probe's flange reaches the plane of the dust collection opening and shall not touch hazardous moving parts.*

19.7.101 A **table saw** shall be constructed so that during normal operation it will not tip over or move.

Compliance is checked by the following tests.

*The tests are conducted with the **table saw** placed on a horizontal surface of Medium Density Fibreboard (MDF) having a density of 650 kg/m^3 to 850 kg/m^3. If the tool is provided with a stand or extension tables, the tool is tested with or without the stands and extension tables in the worst possible configuration(s).*

*A push force of 0,4 **D** is applied to the highest point on the front edge of the **table top**, in the plane of the saw blade and in the direction of the feed. As a result of this test, the **table saw** shall not move.*

*In addition a push force of 1,0 **D** is applied to the highest point on the front edge of the **table top**, in the plane of the saw blade and in the direction of the feed. As a result of this test, the **table saw** may move but shall not tip over.*

*A force of 100 N directed vertically downwards is applied to produce the maximum overturning moment, to any point of any horizontal **table top** surface including extensions. If extension(s) to the **table top** is (are) provided with a support, it shall be tested with the support in place. As a result of the test, the **table saw** shall not tip over.*

19.101 Guarding above the table

19.101.1 General

To guard against unintentional contact with the **cutting edge zone** of the saw blade in the designated guarded area "G", see Figure 104, either a **saw blade guard** mounted to an **extended riving knife** complying with 19.101.2 or an **over-arm saw blade guard** complying with 19.101.3 shall be provided.

The guarded area "G" includes the front **quadrant** and in the rear **quadrant** it includes the region of the saw blade where the radial distance between the tips of saw blade and the **riving knife** is 8 mm or greater. The guarded area "G" extends radially from the periphery towards the centre of the saw blade.

Compliance is checked by inspection.

19.101.2 Saw blade guard mounted to an extended riving knife

19.101.2.1 The saw blade shall be guarded against inadvertent contact from the top and both sides by physical barriers. The barriers may be independent of each other or may be combined in construction and movement. Detailed requirements for the top and side barriers are given in the subsequent subclauses.

Compliance is checked by inspection.

19.101.2.2 One or both side barriers shall rest on the table and shall automatically adjust to the thickness of the advancing workpiece. At least one side barrier shall remain in contact with the workpiece for all cutting depths and bevel positions of the saw blade. If only one side barrier rests on the table or the workpiece with the saw blade at 0° bevel position, the other side barrier shall rest on the table or the workpiece when the saw blade is tilted to its maximum bevel position. In addition, there shall be a provision to position the side barrier(s) without the aid of a tool that allows unobstructed measurement from the front and back of the saw blade to the **rip fence** on either side of the saw blade.

Compliance is checked by inspection.

19.101.2.3 The side barriers of the guarding system shall protect at least the **cutting edge zone** of the guarded area "G" against incidental contact from either side of the saw blade for any **extended riving knife** and saw blade combination specified in accordance with 8.14.2 a).

In addition, the side barriers shall provide safe separation from the front of the saw blade near the **table top**.

Compliance is checked by measurement, by inspection of the perpendicular projection of the side barriers onto the saw blade and the following tests 1 to 4.

*The perpendicular projection measurement of the side barriers is applied to the entire designated guarding area "G" but for the front **quadrant** region of the saw blade that is less than 12 mm above the **table top**, where instead test 2 below is used. For the perpendicular projection measurement of the side barriers and for the test 2 the saw blade is set to **maximum cutting capacity**. For tests 1, 3 and 4, the saw blade is set to any depth of cut and any **bevel angle** setting.*

For tests 1 and 2, a 12 mm diameter cylindrical probe, 100 mm long is used. See Figure 105.

*1) The probe with its axis perpendicular to the line of cut and centred about the plane of the saw blade is rolled on the **table top** until it is stopped by the front edge of either side of the barrier guard, without lifting the guard. The distance measured along the **table top** from the tip of the saw blade to the leading edge of the probe shall be at least 25 mm.*

*2) The probe is advanced whilst in contact with the **table top** along a straight line that is perpendicular to the line of the cut. Without displacing the side barrier guard the probe shall not contact the guarded area "G".*

For tests 3 and 4 the test probe shown in Figure 103 is used. See Figure 105.

*3) The probe with its axis parallel with the plane of the **table top** and perpendicular to the cutting line of the saw blade when advanced along any straight line shall not contact the tips of the saw blade teeth in the guarded area "G".*

*4) The probe is applied to any opening in the surface of the side barrier with a maximum force of 5 N. The probe shall not contact the **cutting edge zone** of the saw blade in guarded area "G".*

19.101.2.4 The top barrier in conjunction with the side barriers shall protect the guarded area "G" of the saw blade against incidental contact from above.

Compliance is checked by the following test, illustrated as "Test A" in Figure 105.

*At any depth and any **bevel angle** setting, the probe in Figure 103, with its axis perpendicular to the **table top** is advanced in a straight line that is perpendicular to the **table top**. The probe is applied with a force not exceeding 5 N and shall not contact the guarded area "G" of the saw blade.*

19.101.2.5 The vertical projection of the top barrier onto the horizontal **table top** shall extend at least 25 mm forward from the front edge of the saw blade above the **table top** at any depth of cut setting.

Compliance is checked by inspection and measurement.

19.101.2.6 Opening(s) in the **saw blade guard** shall be provided for visibility. An opening in the top barrier shall provide for visibility of aligning the saw blade with the intended line of cut during set-up. Such opening shall not extend into the area above the rear **quadrant** of the saw blade. Opening(s) in the side barrier(s) shall provide for monitoring during the cutting operation.

To prevent access to the saw blade, the opening(s) shall be limited in size and location. Any opening that does not meet the requirements of 19.101.2.3 and/or 19.101.2.4 shall be located more than 25 mm forward of the saw blade intersect point with the **table top** and the distance from the guarding barrier to the saw blade shall be at least 3 times its width of the opening at the given location.

Compliance is checked by the test of 19.101.2.3 and/or by the test of 19.101.2.4 and by measurement.

19.101.2.7 The portion(s) of the **saw blade guard** that may incidentally contact the rotating saw blade shall be made of material (e.g. aluminium, plastic) that is unlikely to cause tooth breakage.

Compliance is checked by inspection.

19.101.2.8 A **saw blade guard** and its mounting means shall not cause undue resistance when a workpiece is advanced toward and passed through the saw blade.

Compliance is checked by the following test.

*With the saw blade set at the maximum depth of cut, a workpiece of common wood is cut at a rate of approximately 1,2 m/min. The workpiece has a width of at least 50 mm greater than the width of the guarding system and the length of at least 2**D**. One complete cut, the workpiece being centred about the saw blade and being guided by the **rip fence**, is performed for each applicable combination of workpiece thicknesses and **bevel angle** settings as specified below.*

Workpiece thickness of approximately:

*a) 25 % of the **maximum cutting capacity** with the leading edge of workpiece cut at 0° **bevel angle** and*

- *with a **mitre angle** of 45° right (+);*
- *with a **mitre angle** of 45° left (-);*

*b) 50 % of the **maximum cutting capacity** with the leading edge of workpiece cut at 0° **bevel angle** and*

- *with a **mitre angle** of 45° right (+);*
- *with a **mitre angle** of 45° left (-).*

*Saw blade **bevel angle** settings of:*

a) 0°;

*b) maximum **bevel angle** setting, but not more than 45°.*

*While the test is being conducted, the **saw blade guard** shall not be displaced to a point where it contacts the **cutting edge zone** of the saw blade and the **riving knife** shall not interfere with the passage of the workpiece.*

19.101.2.9 Unless the **table saw** is designed with a **non-removable fixed extended riving knife** that has a permanently attached **saw blade guard**, the **saw blade guard** shall be removable and any fastening means of the **saw blade guard** shall remain attached to the **saw blade guard**.

Compliance is checked by inspection.

19.101.3 **Over-arm saw blade guard**

19.101.3.1 When the **saw blade guard** is not in contact with the workpiece, it shall cover the top and sides of the saw blade and shall be in contact with the **table top** at any depth of cut and bevel setting. While cutting a workpiece, the **saw blade guard** shall automatically adjust to remain in contact with the workpiece.

Compliance is checked by inspection.

19.101.3.2 The **saw blade guard** shall meet the requirements of 19.101.2.3 to 19.101.2.8.

Compliance is checked as specified in the referenced subclauses.

19.101.3.3 The **saw blade guard** shall allow the passage of the workpiece to the saw blade where the thickness of the workpiece is equal to the **maximum cutting capacity**.

*Compliance is checked by a test with appropriate material thickness. The **saw blade guard** is adjusted in height in accordance with 8.14.2 a) 115).*

19.101.3.4 The supporting structure of the **over-arm saw blade guard** shall be so located to not interfere with the free movement of the workpiece during cutting operation as specified in 8.14.2 b) 110).

Compliance is checked by inspection.

19.102 Guarding below the table

Hazardous moving parts below the **table top** shall be guarded.

Compliance is checked by the following test.

*The test probe B of IEC 61032:1997 is applied with a force not exceeding 5 N to all areas below the **table top**. If an enclosure is fitted, the probe is applied to all sides and from underneath the enclosure. The test probe shall not make contact with the **cutting edge zone** of the saw blade and moving parts of the saw blade drive mechanism.*

19.103 Riving knife

19.103.1 A **table saw** shall be equipped with a **riving knife**.

Compliance is checked by inspection.

19.103.2 The **riving knife** and its holder shall be so constructed that for the saw blade diameter ***D*** and for any cutting depth and **bevel angle** settings, the **riving knife** complies with the following specifications:

a) The **riving knife(s)** provided with the **table saw** shall be thicker than the body of the matching saw blade(s) provided with the **table saw** but thinner than the **kerf width** of that saw blade(s).

Compliance is checked by measurement.

b) The **riving knife** shall be located behind and within the planes defined by the tips of the saw blade teeth.

Compliance is checked by inspection.

c) As a result of saw blade depth and **bevel angle** adjustments, the **riving knife** shall maintain the spacing and alignment with the saw blade.

Compliance is checked by inspection and manual test of saw blade adjusting controls.

d) The faces of the **riving knife** shall be parallel planes and smooth; the edges shall not be sharp and shall be slightly chamfered on the edge facing the saw blade.

Compliance is checked by inspection.

*e) The **riving knife** shall have a width, measured at the* **table top** *level and at the* **maximum cutting capacity***, at least equal to 1/6 **D** for the* **riving knife** *or 1/5 **D** for the* **extended riving knife***.*

Compliance is checked by inspection and measurement.

f) The **riving knife** shall be made of steel with a hardness of between 38 HRC and 48 HRC and a rupture resistance at least 800 MPa or an equivalent material.

Compliance is checked by inspection.

19.103.3 A **riving knife** and its holder shall be constructed such that, for the saw blade diameter ***D*** to be used with the designated **riving knife**, and for any cutting depth adjustment with the saw blade perpendicular to the **table top**, the **riving knife** complies with the following specifications:

a) The **riving knife** tip radius shall be 4 mm to 6 mm. The highest point of the **riving knife** or of an **adjustable extended riving knife** in the **riving knife** position shall be within the tip radius and shall be at least 1 mm but not more than 5 mm below the highest point of all saw blades intended to be used with the **riving knife** in accordance with the marking on the **riving knife**, as illustrated in Figure 106. These requirements do not apply to fixed **extended riving knives**.

Compliance is checked by inspection and measurement.

b) Above the **table top**, the linear distance between the **riving knife** and the edge of the saw blade at its closest point shall be at least 3 mm and at any point this distance shall be less than 8 mm, as illustrated in Figure 107. This distance requirement does not apply for the tip radius zone.

For the **extended riving knife**, the 3 mm to 8 mm distance requirement shall be maintained in the rear **quadrant** of the saw blade between the point where the saw blade periphery intersects the **table top** and the point on the periphery of the saw blade that has a height above the **table top** equal to the **maximum cutting capacity** minus 5 mm.

Compliance is checked by inspection and measurement.

19.103.4 The repositioning, or removal and installation, of the **riving knife** necessary for through and **non-through cutting** to achieve the different operating positions in accordance with 8.14.2 a), shall be accomplished

– without the aid of a tool; or

– with the aid of a tool, but it shall not require the removal of a table insert, cover, or saw blade access panel, etc. The tool needed shall be tethered to the saw in a reliable and durable method that does not present any risk of entanglement with powered saw parts, the workpiece or work feeding devices.

After repositioning or installation of the **riving knife** to the applicable operating positions, there shall be no further need for realignment or adjustment of the **riving knife** with the saw blade. In addition, the **riving knife** fastening means for any re-positioning, or removal and installation, in accordance with 8.14.2 a) shall remain attached to either the **riving knife** or to the **table saw**.

The above requirement is not applicable, if the **table saw** is designed with a **non-removable fixed extended riving knife** that has a **non-removable saw blade guard**.

Compliance is checked by inspection.

19.104 Saw blade guard and anti-kickback device system requirements

19.104.1 When setting up the **table saw** in accordance with 8.14.2 a), between any configurations for

– **through cutting**;

– **non-through cutting**;

– or any operation not requiring the function of the **riving knife**

then the removal, installation or positioning, as applicable, of the

– **saw blade guard**;

– **riving knife**;

– **anti-kickback device**, if any;

– or any combination of the above

shall be accomplished within 30 s. After setting up the **table saw** for these configurations, there shall be no further need for realignment or adjustment of the applicable devices.

The above requirement is not applicable, if the **table saw** is designed with a **non-removable fixed extended riving knife** that has a **non-removable saw blade guard**.

*Compliance is checked by inspection, by manual test and by measurement. The manual test is conducted after the operator has carried out the required operations, in accordance with 8.14.2 a), at least ten times. The storage of the **saw blade guard**, **riving knife** and/or any **anti-kickback device** as well as the removal or installation of the cutting tool, is not included in the 30 s time requirement.*

19.104.2 The **saw blade guard** mounted to an **extended riving knife**, the **extended riving knife** and the **anti-kickback device**, if any, shall be designed to meet the following requirements:

a) The **saw blade guard** shall be mounted to the **extended riving knife**, independently or in combination with the **anti-kickback device**. The removal of the **saw blade guard** shall not affect the performance of the **extended riving knife**.

b) The **anti-kickback device** shall be capable of being disabled or removed without influencing the performance of the **saw blade guard** function and of the **extended riving knife**.

The above requirement is not applicable, if the **table saw** is designed with a **non-removable fixed extended riving knife** that has a **non-removable saw blade guard**.

Compliance is checked by inspection.

19.104.3 The **saw blade guard**, **anti-kickback device**, if any, **riving knife**, **rip fence**, **cross-cutting fence** and the push stick shall have provisions on the **table saw** for storage where it does not obstruct the cutting process or any adjusting or operating device(s).

Compliance is checked by inspection.

19.104.4 The **saw blade guard** mounted to a **fixed extended riving knife** or to an **adjustable extended riving knife** and the **anti-kickback device**(s), if any, at any depth of cut and bevel setting shall:

a) allow the passage of the workpiece to the saw blade where the thickness of the workpiece is equal to or less than the **cutting capacity** of the saw;

b) minimize mechanical hazards, such as jamming or wedging of the workpiece, when sawing material thicker than the **cutting capacity**.

Compliance is checked by testing at the following settings:

*– at **maximum cutting capacity** and at 50 % of the **maximum cutting capacity**;*

– at 0° and 45° bevel settings (or at maximum bevel setting permitted by design, whichever is smaller).

*The **fixed extended riving knife** or the **adjustable extended riving knife** in the **extended riving knife** position, within its construction limits, is adjusted to its minimum radial distance to the saw blade near the top of the saw blade, in accordance with 19.103.3 b).*

*Test blocks having a minimum length of 500 mm, and having sufficient width for the **saw blade guard** to remain in contact with the top surface of the test block and a thickness as specified in test 1 and test 2 below, is guided by the **rip fence** on the **table top** with the block to be cut down the middle of the width. The front edge of the test blocks shall be perpendicular to the **table top** and at 0° **mitre angle**. For slide saws the test is carried out with the slide mechanism locked in a stationary position.*

*1) A test block having a thickness equal to the **cutting capacity**, for the appropriate bevel and depth of cut settings, shall move without any interference during the cut from the front to the back end of the table.*

*2) The **saw blade guard** shall not allow contact of the test blocks with the saw blade if the test block is 10 mm thicker than the test blocks used in test 1 for each depth of cut setting at the 0° bevel setting, and if the test block is 6 mm thicker than the test blocks used in test 1 for each depth of cut setting at the 45° bevel setting (or at maximum bevel setting permitted by design, whichever is smaller).*

19.105 Run-down time

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 the following test, which is performed ten times.

A steel test disk with a thickness of 2 mm and a diameter in accordance with 8.3 is mounted to the tool. The tool motor is switched on for a minimum of 30 s, then switched off. The rundown 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 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.

Compliance is checked by measurement and by inspection of the tool and by 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.

20.3 This subclause of Part 1 is not applicable.

20.5 This subclause of Part 1 is not applicable.

20.101 The **riving knife** and its holder shall have sufficient strength and resilience to sustain forces associated with reasonably foreseeable misuse during cutting operations.

Compliance is checked by measurement and the following tests 1 and 2. Prior to the tests, the tool is set up as follows:

*a) The saw blade is set to **maximum cutting capacity**. The **riving knife** is mounted in accordance with the instructions in 8.14.2a).*

*b) For **riving knives** or **adjustable extended riving** knives in the **riving knife** position: within their construction limits, they are adjusted to their minimum distance at the tip radius in accordance with 19.103.3b) and to their highest position in accordance with 19.103.3 a). At the centre of the tip radius a small test hole is drilled to accommodate the test.*

*c) For **fixed extended riving knives** and **adjustable extended riving knives** in the **extended riving knife** position: within their construction limits, they are adjusted to its minimum distance to the top of the saw blade, in accordance with 19.103.3 b). To accommodate the test, a small test hole is drilled 2 mm radially from the edge facing the saw blade and at the height from the **table top** equal to the **maximum cutting capacity** minus 3 mm.*

*d) For **adjustable extended riving knives**: small test holes are drilled in both locations according to b) and c) above and test 1 and test 2 are conducted for the position yielding the most adverse result.*

*1) At the hole provided for this test, a pull force F = 1,0 **D** is applied for 1 min opposite to the direction of feed and parallel to the **table top** as shown in Figure 108. While the force is being applied, the **riving knife** shall not deflect or displace to contact the saw blade tips. In addition, after the test, the linear spacing between the tips of the saw blade and the* **riving knife** *shall not be less than 2 mm.*

*2) At the hole provided for this test, a pull force of 30 N is applied for 1 min perpendicular to the direction of feed and parallel to the **table top**, as shown in Figure 109. The test is made in both directions. After each test, the **riving knife** shall be within the planes defined by the tips of the saw blade supplied with the saw.*

20.102 Means for transportation of the **table saw** as required by 19.4 shall be of adequate strength to safely transport the tool.

Compliance is checked by inspection and 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.

20.103 A working stand, 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 **table saw** is mounted to the working stand and an additional force is gradually increased to a value of 3**D** and then applied for 1 min, distributed equally on the **table top** of the **table 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:

21.18.2.1 Addition:

After voltage recovery, following an interruption of the supply, the tool shall not automatically restart.

21.30 This clause of Part 1 is not applicable.

21.35 Replacement:

Table saws shall have either an integral dust collection/suction device or device(s) which allow the mounting of external suction device for evacuating the by-products of the sawing process. The dust collection device(s) shall:

– operate below the **table top** and, for devices which allow the mounting of external suction devices, direct the discharge away from the operator;

– not interfere with the performance and operation of **saw blade guards**, **riving knife** and the saw blade adjusting mechanism.

Compliance is checked by inspection.

21.35.101 If a supplementary dust collection is provided above the **table top** it shall:

– have a connection point not interfering with the visibility to the point of operation;

– be designed to direct the discharge away from the operator;

– not interfere with the **saw blade guard** protection requirements of 19.101;

– not interfere with the **anti-kickback device** requirements of 21.106.3.1 to 21.106.3.3.

Compliance is checked by inspection with the dust collection or the dust suction device including hoses supplied in accordance with 8.14.2 a) attached to the opening, and as specified in the referenced subclauses.

21.101 Construction to facilitate cutting tool installations

21.101.1 **Table saws** shall be provided with a saw blade. The **table saw** shall be constructed so that saw blades with diameters 2 % larger than the saw blade diameter ***D*** cannot be mounted.

*Compliance is checked by inspection and the following test. It shall not be possible to mount a disc with a diameter 2 % larger than **D**.*

21.101.2 To allow easy access for changing the cutting tool and tightening of the spindle fastener, a **table saw** shall be provided with a table insert or a saw blade access panel in the **table top**. Alternatively or in addition, the saw blade access panel may be provided in the enclosure below the **table top**.

Compliance is checked by inspection.

21.101.3 The table insert or saw blade access panels shall be securely held in place, so as to prevent unintentional removal while the saw is in operation.

Compliance is checked by inspection and the following test.

*For a table insert or a saw blade access panel in the **table top**, a pull force indicated below perpendicular to the **table top** is applied sequentially at locations that are in line and within a 25 mm distance from the front and back of the saw blade.*

– 10 N for table inserts or saw blade access panels where the width of the saw blade slot is 6 – 12 mm plus the width of the thickest saw blade specified in 8.14.2 a);

*– 60 N behind the saw blade and 10 N in front of the saw blade for **zero clearance table inserts** or saw blade access panels or where the width of the saw blade slot is less than 6 mm plus the width of the thickest saw blade specified in 8.14.2 a).*

During the test, the table insert or the saw blade access panel shall not be elevated by more than 25 mm and after the test they shall meet the requirements of 21.101.4.

For saw blade access panels below the table, a 10 N pull force applied perpendicularly to the panel shall not displace the panel.

21.101.4 A table insert or saw blade access panel in the **table top** shall be designed such that, when installed in accordance with 8.14.2 a), no portion of the table insert or saw blade access panel is above or more than 0,7 mm below the plane of the **table top** surface at the infeed side and no portion of the table insert or saw blade access panel is below or more than 0,7 mm above the plane of the **table top** at the out-feed side.

Compliance is checked by inspection and measurement.

21.101.5 The table insert or the saw blade access panel in the **table top** within 15 mm from the blade adjacent to the **cutting edge zone** shall be made of material not likely to cause tooth breakage in the event of contact with the rotating saw blade.

Compliance is checked by inspection.

21.101.6 The slot in the table insert or the saw blade access panel in the **table top** for protruding cutting tool shall have a width:

– for a single saw blade, the slot width shall not exceed 12 mm plus the **kerf width** of the thickest saw blade in accordance with 8.14.2 a);

– for cutting tools other than single saw blades, e.g. dado, the slot width shall not exceed 12 mm plus the maximum **kerf width** of the cutting tool in accordance with 8.14.2 a). The table insert for cutting tools other than single saw blades shall be distinctly marked and differentiated from table insert for a single saw blade, in accordance with 8.3.104;

– a **zero clearance table** insert may be used provided the slot has been pre-cut by the manufacturer to accommodate the passage of the **riving knife**. The slot for the saw blade may be cut by the saw blade of the **table saw**.

Compliance is checked by inspection and by measurement.

21.101.7 Apertures in the table insert or the saw blade access panel, other than the slot for the cutting tool, may be provided to facilitate their removal for the purpose of saw blade replacement. These apertures shall be designed to ensure that any access through the aperture is directed away from the saw blade.

Compliance is checked by inspection and the following test.

*With the probe B of IEC 61032:1997 inserted into the aperture but only articulated in the direction of the aperture design, it shall not be possible to contact the **cutting edge zone** of the largest saw blade at 0° bevel setting.*

NOTE In Europe (EN 62841-3-1), the following additional subclause applies:

The saw blade provided with the tool, if intended for cutting wood and analogous materials, shall comply with EN 847-1.

Compliance is checked by inspection and by receipt of relevant information from the saw blade manufacturer.

21.102 Push stick

21.102.1 **Table saws** shall be provided with a push stick. The push stick shall

a) be made from a non-metallic material;

b) have a grasping area, either obvious by design or as indicated in 8.14.2 a), with a minimum length of 70 mm,

c) have a 90° notch, with a minimum length of a hold down surface of the notch $N > 0{,}5C$ and with the height of the notch $H > 0{,}2C$ as shown in Figure 110;

d) have the hold down surface *N* with a 20° to 30° angular orientation with respect to the line connecting the corner of the notch with the centre of the grasping area as shown in Figure 110;

e) have a minimum separating distance from the notch to the closest portion of the defined grip $L > 3C$.

C is the **maximum cutting capacity**.

An example of a push stick profile and of a suitable mouth design is shown in Figure 110.

Compliance is checked by inspection and measurement.

21.102.2 A push stick shall have the strength to withstand the forces anticipated in normal use.

Compliance is checked by the following test.

*The push stick notch is positioned to have full surface contact with the horizontal and the vertical sides of a suitable block of wood on a flat supporting surface, as indicated in Figure 111. The test may be conducted in a fixture that is loading the push stick in an equivalent manner. A force gradually applied at the centre of the grasping zone is increased until the horizontal component F reaches the value of 2**D** and is maintained for 10 s. The grasping area and the notch area on the push stick may be supported to prevent the lateral displacement of the push stick during the test. As a result of the applied force, the push stick shall not permanently deform, break or show cracking visible with normal vision.*

21.103 Saw blade alignment

21.103.1 The **table saw** shall maintain the parallelism of the saw blade with the guiding system of a **cross-cutting fence** (e.g. mitre gauge slot, sliding table for a **cross-cutting fence** or the guiding rails of a pull type saw), as applicable.

Compliance is checked by the following test.

*The saw blade initial set-up alignment is performed in accordance with 8.14.2 a), if any. The **table saw** is fitted with a true planar metal disc with diameter **D**.*

*a) The distance from the guiding system to the disc is measured less than 6 mm above the **table top** level and 6 mm from the edge of the disc at **maximum cutting capacity** setting.*

*b) Utilizing a **cross-cutting fence**, the measuring instrument is guided between the front and the back portion of the disc, making sure that the tolerance play within the guiding system is eliminated.*

c) For pull type saws, the measuring instrument is held stationary and the saw blade assembly is pulled to make the measurements at the front and back portion of the disc.

*The difference between the actual measured position at the front and the back of the disc shall be less than 0,2 % of **D**.*

21.103.2 The depth of cut and **bevel angle** settings as well as the saw blade alignment shall not change and cause saw blade jamming during normal and reasonably foreseeable misuse cutting. In addition for a pull type **table saw**, the saw blade guide locking mechanism during the ripping operation shall not allow the displacement of the saw blade assembly.

Compliance is checked by the following tests:

Test modules:

*a) For these tests, a saw blade with the diameter **D** is installed and the saw blade adjustments are made in accordance with 8.14.2 a). The saw blade is set to **maximum cutting capacity** at the given bevel settings. Once the saw blade adjustments are made, they shall not be readjusted during the test or prior to the measurements. A tooth tip and an adjacent tooth gullet are marked for the measurements.*

*b) Standard dimensional lumber with thickness approximately 50 % of the **maximum cutting capacity** is utilized for these tests.*

*c) For a pull type saw, prior to commencing the ripping operation, lock the saw blade assembly in the **rip cutting** position in accordance with 8.14.2 b) and mark the saw blade assembly position in such way as to detect a displacement from the locked position greater than 1 mm.*

*d) For each test, the tool is operated at rated input or rated current, interlaced with 150 % overloads for approximately 2 s each. First, approximately 3 min of cumulative cutting time and 3 overloads are performed in **cross cutting** operation, followed by approximately 7 min of cumulative cutting time and 7 overloads performed in ripping operation.*

Bevel setting evaluation:

*1) Prior to commencing the test of d), the saw blade **bevel angle** is set to the midpoint of the bevel adjusting range. The marked tooth gullet is rotated to the 12 o'clock position. The **bevel angle** of the saw blade is measured in the plane perpendicular to the **table top**, line of cut and intersecting the marked tooth gullet as shown in Figure 112. The accuracy of angular measurements shall be within ±0,1°. The measured **bevel angle** is recorded.*

2) Conduct the test in accordance with d).

*3) After the conclusion of the test, the **bevel angle** of the marked tooth gullet shall be measured as above. The before and after test measurements of the saw blade **bevel angle** shall not differentiate by more than 1°. In addition, for pull type saws the position of the saw blade assembly shall not have displaced by more than 1 mm.*

Depth of cut evaluation:

*1) Prior to commencing the test of d) the saw blade is set to 0° **bevel angle**. The marked tooth is positioned at the 12 o'clock position and its height over the **table top** shall be measured and recorded. The accuracy of the measurements shall be within ±0,1 mm.*

2) Conduct the test in accordance with d).

*3) After the conclusion of the test, the height of the marked tooth is measured as above. The before and after test measurements of the saw blade height shall not differentiate by more than 1 % of **D**. In addition, for pull type saws the position of the saw blade assembly shall not have displaced by more than 1 mm.*

Saw blade alignment evaluation:

The measurement of 21.103.1 is repeated after the conclusion of the above tests, except for the initial saw blade set-up alignment.

21.104 Table top

21.104.1 A **table saw** shall be designed such that for all operations in accordance with 8.14.2 a) the **table top** remains in an approximately horizontal plane.

Compliance is checked by inspection.

21.104.2 A **table top**, excluding **table top** extensions, shall have the following principal dimensions as specified in Figure 113.

$a > 3/4\ \boldsymbol{D}$

$b > 1/2\ \boldsymbol{D} + b_2 + b_3$

$c > 1/2\ \boldsymbol{D} + c_2 + c_3$

d > 1/3 ***D***

where

$b_2 = 3/8\ \boldsymbol{D}$ if the **cross-cutting fence** guide is provided on the left side of the saw blade;

c_2 = 3/8 ***D*** if the **cross-cutting fence** guide is provided on the right side of the saw blade;

b_3 = 3/8 ***D*** if the saw blade is bevelling to the left;

c_3 = 3/8 ***D*** if the saw blade is bevelling to the right.

The dimensions for b_2, b_3, c_2, and c_3 are equal to zero if the relevant function is not provided on the considered side of the table.

For a **table saw with sliding function**

– the b_2 and *c*2 dimensions are equal to zero;

– the *a* dimension in the sliding action mode shall be greater than 3/4 of the **maximum cutting capacity**.

*Compliance is checked by measurement from the edge of the **table top** to the intersecting line of the saw blade periphery with the **table top** plane, at **maximum cutting capacity**.*

21.104.3 The perpendicular projection of the front edge of the **saw blade guard** onto the **table top** shall be at least ***D***/5 from the front edge of the **table top**, as illustrated in Figure 114. For a **table saw with sliding function** this requirement is applicable for any fixed working position of the saw blade assembly in accordance with 8.14.2 a) 116).

Compliance is checked by measurement.

21.104.4 To ensure unobstructed passage of the workpiece, the **table top** surface:

a) shall be flat;

b) within the surface area defined by the minimum values of the **table top** dimensions of *"b"* and *"c"*, shall be without any depressions or holes with the exception of:

– mitre gauge slots,

– opening for the table insert,

– minimal diameter recess holes for fasteners,

– recessed pockets for any warning symbols less than 0,7 mm deep;

c) may be profiled, e.g. by contoured narrow grooves that are in the direction of the material feed. The depth of the profiled grooves shall be limited to 1 mm.

Compliance with a) is checked by the following measurement.

*The **rip fence** is set, in accordance with 8.14.2 b), to three random positions on each side of the saw blade between 20 % and 80 % of the "b" or "c" **table top** dimensions (see Figure 113) from the saw blade, as applicable. The gap between the bottom of the **rip fence** and the **table top** surface is measured by feeler gauges at approximately the front 10 % of the **table top** front to back length and approximately at the saw blade centre position. Measurements shall not be made over the features listed in b) and c).*

At any measured location:

*– it shall not be possible to insert a 2 mm feeler gauge between the **table top** and **rip fence**, beyond the face of the **rip fence**, without applying a force exceeding 5 N;*

*– the maximum and minimum gap measurement between the **table top** and the bottom of the **rip fence**, measured with an accuracy of 0,1 mm, shall not differentiate by more than 1,5 mm.*

Compliance with b) and c) is checked by inspection and by measurement.

21.105 Rip fence and cross-cutting fence

21.105.1 A **table saw** shall be provided with a **rip fence** to guide the workpiece. The **fence** provided may be designed to function as **cross-cutting fence** as well as a **rip fence**.

Compliance is checked by inspection.

21.105.2 The workpiece guiding surface of the **rip fence** may be adjustable along the direction that is parallel with the plane of the saw blade. The design shall ensure that for any **rip fence** position the guiding is provided at least between the front edge of the **table top** surface and the centre of the saw blade.

For **table saws** with sliding function, this requirement applies only in the lockable rip-cutting position. For **table saws with sliding function** that cannot meet the requirement concerning the **rip fence** guiding surface length for all positions in which the **rip fence** can be mounted to the **table top**, the position of the **rip fence** mounting means to the **table top** and the position of the **rip fence** meeting this requirement shall be clearly marked.

Compliance is checked by inspection.

21.105.3 A **rip fence** shall be designed that it can be firmly secured to the table and shall not loosen under normal operating conditions. The **rip fence** shall have two guiding surfaces perpendicular to the **table top**. One of the guiding surfaces when facing the saw blade shall have a minimum height of 2/3 of the **maximum cutting capacity** and the other guiding surface when facing the saw blade shall have a height between 1/10 and 1/5 of the **maximum cutting capacity** and wide enough for the **fence** not to interfere with the side barrier of the **saw blade guard**.

If the **rip fence** can be used on the bevelling side of the **table top**, the lower guiding surface shall be capable of facing towards the saw blade.

The portion(s) of the **rip fence** that may incidentally contact the rotating saw blade shall be made of material (e.g. aluminium, plastic) that is unlikely to cause tooth breakage.

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

*The saw blade is set for **maximum cutting capacity**. The **rip fence** is set in accordance with 8.14.2 b), with the low guiding surface positioned under the side barrier guard and touching the saw blade. Without inducing any sideway displacement, the side barrier is lifted just above the **maximum cutting capacity** and allowed to return on to the surface of the low **rip fence**. No portion of the **rip fence** shall obstruct the free movement of the side barrier guard.*

21.105.4 A **rip fence** shall allow for parallel setting with the saw blade and the **rip fence** guiding system shall consistently align it parallel with the saw blade at any clamped position. The deviation from the parallel position shall be less than 0,3 % of ***D***.

Compliance is checked by measurement and the following test.

*The saw blade is initially aligned in accordance with 8.14.2a), if any. For **table saws** with sliding function, the saw blade is locked in the rip-cutting position. The **table saw** is fitted with a true planar metal disc with diameter **D** and set to* **maximum cutting capacity***. For a **rip fence** that does not extend past the centre of the saw blade, a straight edge extension is attached to the workpiece guiding surface. The **rip fence** is moved and set or clamped/unclamped in accordance with 8.14.2 8.14.2 b), to 3 random positions on each side of the saw blade between 20 % and 80 % of the "b" or "c" **table top** dimensions (see Figure 113) from the saw blade as applicable. The distance from the **rip fence** to the front and back edge of the disc is measured less than 6 mm above the **table top** level. The difference between the two measurements at the given **fence** location is recorded as a deviation from parallelism.*

21.105.5 A **rip fence** shall be rigid and have sufficient strength to guide the workpiece under reasonably expected ripping operations. The normal displacement of the **rip fence** with respect to the saw blade under typical load shall be less than 0,3 % of ***D***.

Compliance is checked by measurement and the following test.

*a) The **rip fence** in the high position is clamped in accordance with 8.14.2 b) at one position between 20 % and 80 % of the "b" or "c" **table top** dimensions (see Figure 113) from the saw blade on each side of the saw blade, if applicable.*

*b) Apply a force in a direction away from the saw blade, perpendicular to the vertical plane of the **rip fence** through the centre point of a hard wood block that is sufficiently thick to distribute the load, 1/2 **D** long and has a height equal to the height of the **rip fence** while resting on the **table top** surface.*

c) The force load test is conducted at two positions:

*1) The block is positioned to be flush with the front edge of the **table top** and the force equal to 1/2 **D** is applied at the centre point of the block.*

2) The block is centred between the centre and the front edge of the saw blade. A force is applied at the centre point of the block equal to:

*– 1/6 **D** for a **rip fence** secured on one side of the table;*

*–1/4 **D** for a **rip fence** secured at the front and back of the **table top**.*

*d) While the force is applied, measure the displacement of the **rip fence** surface contacting the block at the corresponding centre point of the block with respect to a stable reference point on the **table top**.*

21.105.6 Table saws shall be provided with a **fence** to facilitate **cross cutting** operation. The **fence** provided may be designed to function as **cross-cutting fence** as well as a **rip fence**.

If the **cross-cutting fence** is not laterally adjustable, it shall not contact the **saw blade guard** at any saw blade orientation.

If the **cross-cutting fence** is laterally adjustable, it shall be capable of being secured in a position to prevent contact with the **saw blade guard** at any saw blade orientation. The portion(s) of the adjustable **cross-cutting fence** that may incidentally contact the rotating saw blade shall be made of material (e.g. aluminium, plastic) that is unlikely to cause tooth breakage.

Compliance is checked by inspection.

21.105.7 The **cross-cutting fence** shall be designed such that it will not entirely lift up or swing out of position and shall be supported by the **table top**.

Compliance is checked by the following test.

*When the workpiece guiding surface of the **cross-cutting fence** is positioned 50 to 55 mm from the front edge of the **table top**, it shall not fall out or be able to be lifted up out of position.*

21.106 Kickback hazard reducing devices

21.106.1 To reduce the risk of **kickback** hazard, either the **rip fence** provided in accordance with 21.105 shall also meet the requirements of 21.106.2 or an **anti-kickback device** meeting the requirements of 21.106.3 shall be provided with the **table saw**.

21.106.2 **Additional requirements for the rip fence**

21.106.2.1 A **rip fence** shall allow for parallel setting with the saw blade and the **rip fence** guiding system shall consistently align it parallel with the saw blade at any clamped position. The deviation from the parallel position shall be less than 0,2 % of ***D***.

Compliance is checked by measurement and the following test.

*The saw blade is initially aligned in accordance with 8.14.2 a), if any. For **table saws** with sliding function, the saw blade is locked in the rip-cutting position. The **table saw** is fitted with a true planar metal disc with diameter **D** and set to **maximum cutting capacity**. For a **rip fence** that does not extend past the centre of the saw blade, a straight edge extension is attached to the workpiece guiding surface. The **rip fence** is moved and set or clamped/unclamped in accordance with 8.14.2 b), to 5 random positions on each side of the saw blade between 20 % and 80 % of the "b" or "c" **table top** dimensions (see Figure 113) from the saw blade as applicable. The distance from the **rip fence** to the front and back edge of the disc is measured less than 6 mm above the **table top** level. The difference between the two measurements at the given **fence** location is recorded as a deviation from parallelism.*

21.106.2.2 A **rip fence** shall be rigid and have sufficient strength to guide the workpiece under reasonably expected ripping operations. The normal displacement of the **rip fence** with respect to the saw blade under typical load shall be less than 0,2 % of ***D***.

Compliance is checked by measurement and the following test.

*a) The **rip fence** in the high position is clamped in accordance with 8.14.2 b) at one position between 20 % and 80 % of the "b" or "c" **table top** dimensions (see Figure 113 from the saw blade on each side of the saw blade, if applicable.*

*b) Apply a force in a direction away from the saw blade, perpendicular to the vertical plane of the **rip fence** through the centre point of a hard wood block that is sufficiently thick to distribute the load, 1/2 **D** long and has a height equal to the height of the **rip fence** while resting on the **table top** surface.*

c) The force load test is conducted at two positions:

*1) The block is positioned to be flush with the front edge of the **table top** and the force equal to 2/3 **D** is applied at the centre point of the block.*

2) The block is centred between the centre and the front edge of the saw blade. A force is applied at the centre point of the block equal to:

*– 1/5 **D** for a **rip fence** secured on one side of the table;*

*– 1/3 **D** for a **rip fence** secured at the front and back of the **table top**.*

*d) While the force is applied, measure the displacement of the **rip fence** surface contacting the block at the corresponding centre point of the block with respect to a stable reference point on the **table top**.*

21.106.3 **Requirements for anti-kickback devices**

21.106.3.1 The **extended riving knife** mounted **anti-kickback device** shall be mounted independently from the side barriers and so constructed that it can be easily enabled and disabled, or made so that the **anti-kickback device** can be removed and replaced without any need to adjust or remove the **extended riving knife**, for:

– **non-through cutting** operations, such as **grooving**, **rabbeting**, etc., if permitted in accordance with 8.14.2 a), or

– **cross cutting** operation on a **table saw with sliding function**.

Compliance is checked by inspection.

21.106.3.2 **Anti-kickback device**(s) shall provide sufficient restraint to prevent removal of a workpiece of any thickness up to and including the **maximum cutting capacity**.

Compliance is checked by the following test.

*With the **table saw** set to the **maximum cutting capacity**, feed a piece of wood, such as pine, with a thickness of approximately 25 % of the **maximum cutting capacity** into the **anti-kickback devices** from the feed direction, so that about 50 mm is fed past the point where the device contacts the wood. With the wood in place under the **anti-kickback device**, attempt to remove the material by pulling the wood opposite to the direction of feed and parallel to the **table top** with a force of 20 N for a time between 5 s and 10 s. It shall not be possible to completely slide the material out from under the **anti-kickback device**. Repeat the test with a thickness of approximately 90 % of the **maximum cutting capacity**.*

21.106.3.3 **Anti-kickback device**(s) shall be so designed as to oppose the thrust of a workpiece thrown by the saw blade.

Compliance is checked by measurement and the following test.

*For these tests the saw blade shall be set to **maximum cutting capacity**. The **riving knife** is adjusted to minimum linear distance to the saw blade, in accordance with 19.103.3 b).*

*a) A smoothly planed wooden test block with a thickness of approximately 25 % of the **maximum cutting capacity** and strong enough to withstand the applied forces shall be partially cut (i.e. ripped), long enough to reach from the front of the saw blade past the **anti-kickback device**.*

*b) The test block is positioned to straddle the saw blade and the **riving knife** and the **antikickback device**(s) is (are) engaged with the test block with a force not exceeding 5 N.*

*c) A force of 2**D** shall be applied to the test block for 1 min, opposite to the direction of feed and parallel to the **table top**, as shown in Figure 115.*

*d) During the test, the **anti-kickback device** shall remain engaged with the test block and attached to its supporting member. The **anti-kickback device** and its supporting member shall not*

– be permanently deformed;

– contact the saw blade.

21.107 **Table saw spindle and flanges**

21.107.1 The **table saw** spindle shall have a diameter not less than 12 mm for a saw blade having a diameter ***D*** less than or equal to 200 mm and not less than 15 mm for a saw blade having a diameter of greater than 200 mm. The ultimate tensile strength for the spindle shall be a minimum of 350 N/mm^2.

Compliance is checked by inspection and measurement.

21.107.2 The **table saw** spindle shall have a normal rotation that is clockwise when viewed from the left of the position normally assumed by the operator. The spindle shall have a provision to be keyed to the outer saw blade flange or it shall be otherwise prevented to rotate with respect to the flange(s).

Compliance is checked by inspection.

21.107.3 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.

21.107.4 The saw blade retaining fastener(s) in conjunction with the spindle shall not loosen under any operations, 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.

*The most massive saw blade with the diameter **D** in accordance with 8.14.2 a) is installed on the **table saw**. With the saw blade not rotating, the **table saw** is started, allowed to reach operating speed and shut down. This cycle is repeated ten times. The saw blade shall not become loose during and at conclusion of the test.*

21.107.5 The saw blade supporting flanges, as illustrated in Figure 116, 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 at least 0,1 times the diameter of the smaller flange.

Compliance is checked by inspection and by measurement.

21.108 **Table saws with sliding function** shall have at least one lockable **rip cutting** position.

Compliance is checked by inspection.

22 Internal wiring

This clause of Part 1 is applicable.

23 Components

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

23.3 Addition:

Protection devices (e.g. overload or over-temperature protection devices) or circuits that switch off the **table saw** shall be of the non-self-resetting type.

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.

No Text on This Page

28 Creepage distances, clearances and distances through insulation

This clause of Part 1 is applicable.

Figure 101 – Marking of the riving knife

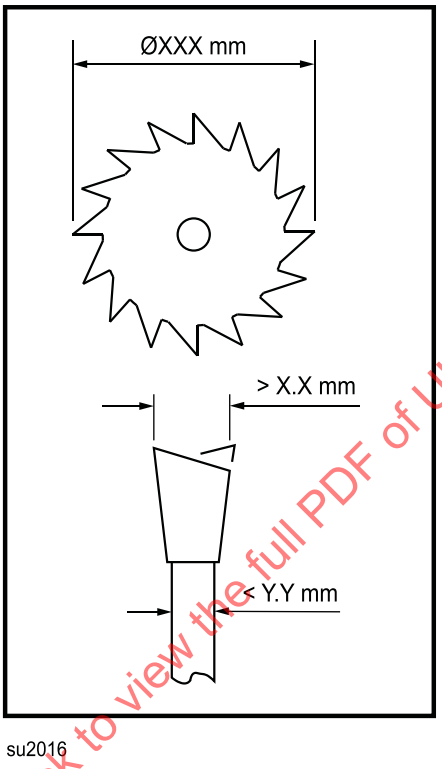
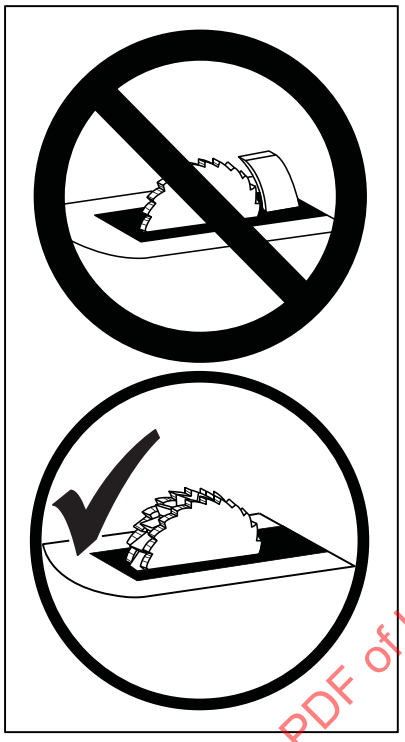
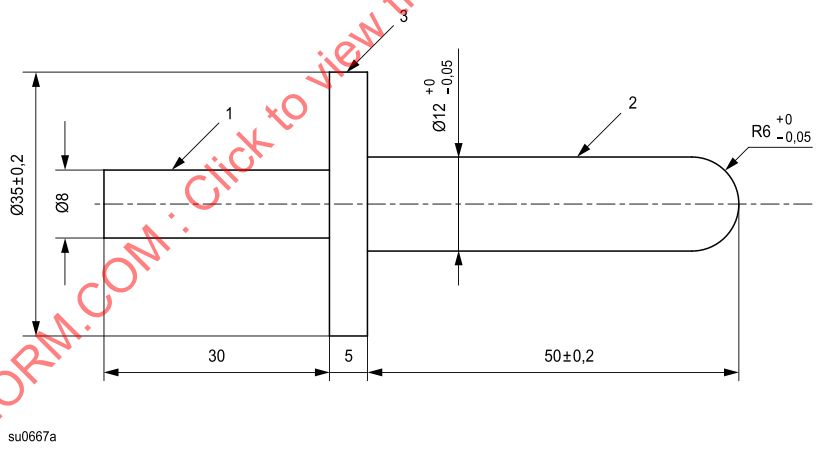


Figure 102 – Marking of table inserts for cutting tools other than a single saw blade



su2017

Figure 103 – Test probe



su0667a

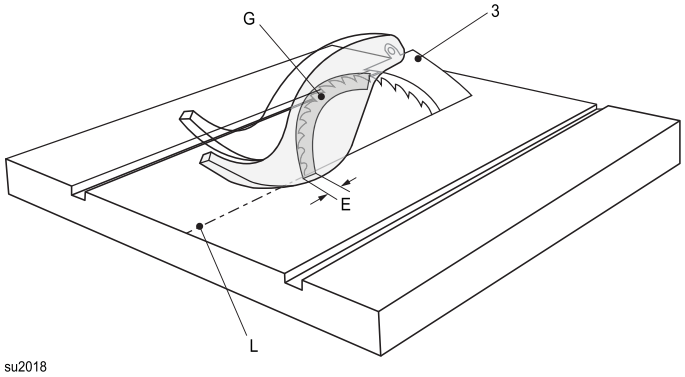
Key

1 handle section

2 test section

3 probe's guard

Figure 104 – Guarded area of the saw blade



Key

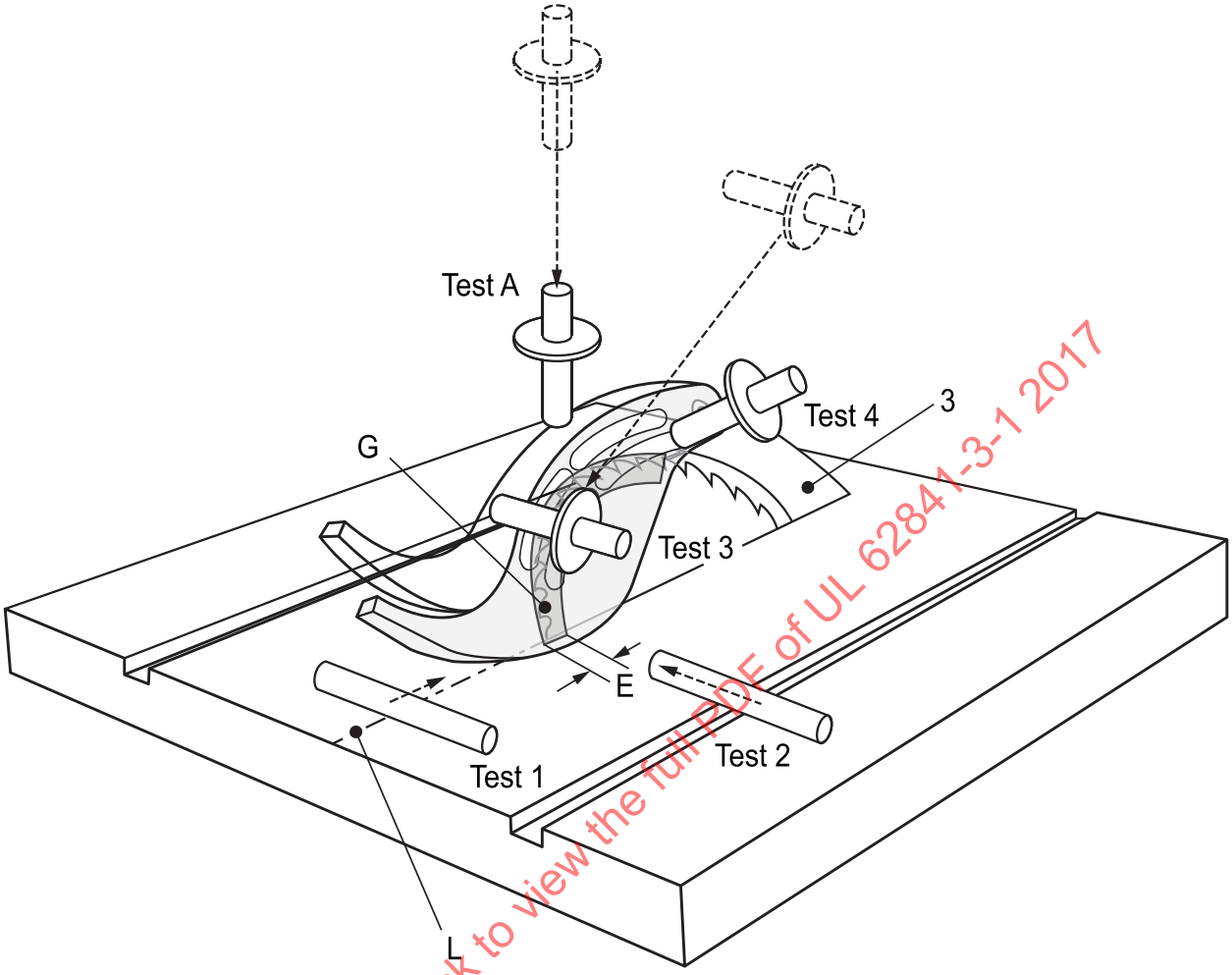
3 **extended riving knife**

G guarded area

L line of cut

E **cutting edge zone**

Figure 105 – Probe application to the saw blade guard



su2019

Key

3 **extended riving knife**

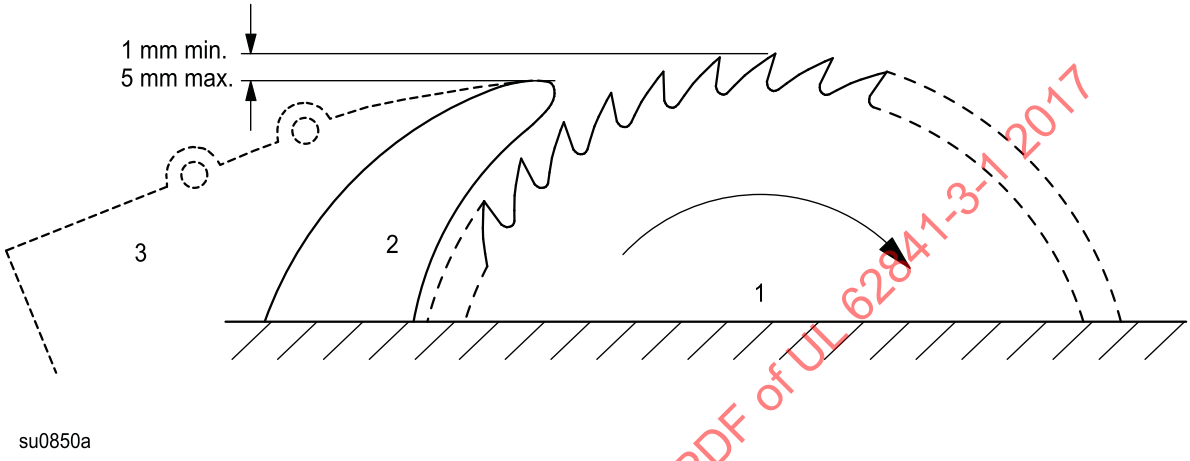
G guarded area

L line of cut

E **cutting edge zone**

NOTE The top barrier is present during the test but not shown for illustration purposes only.

Figure 106 – Height range of the riving knife tip



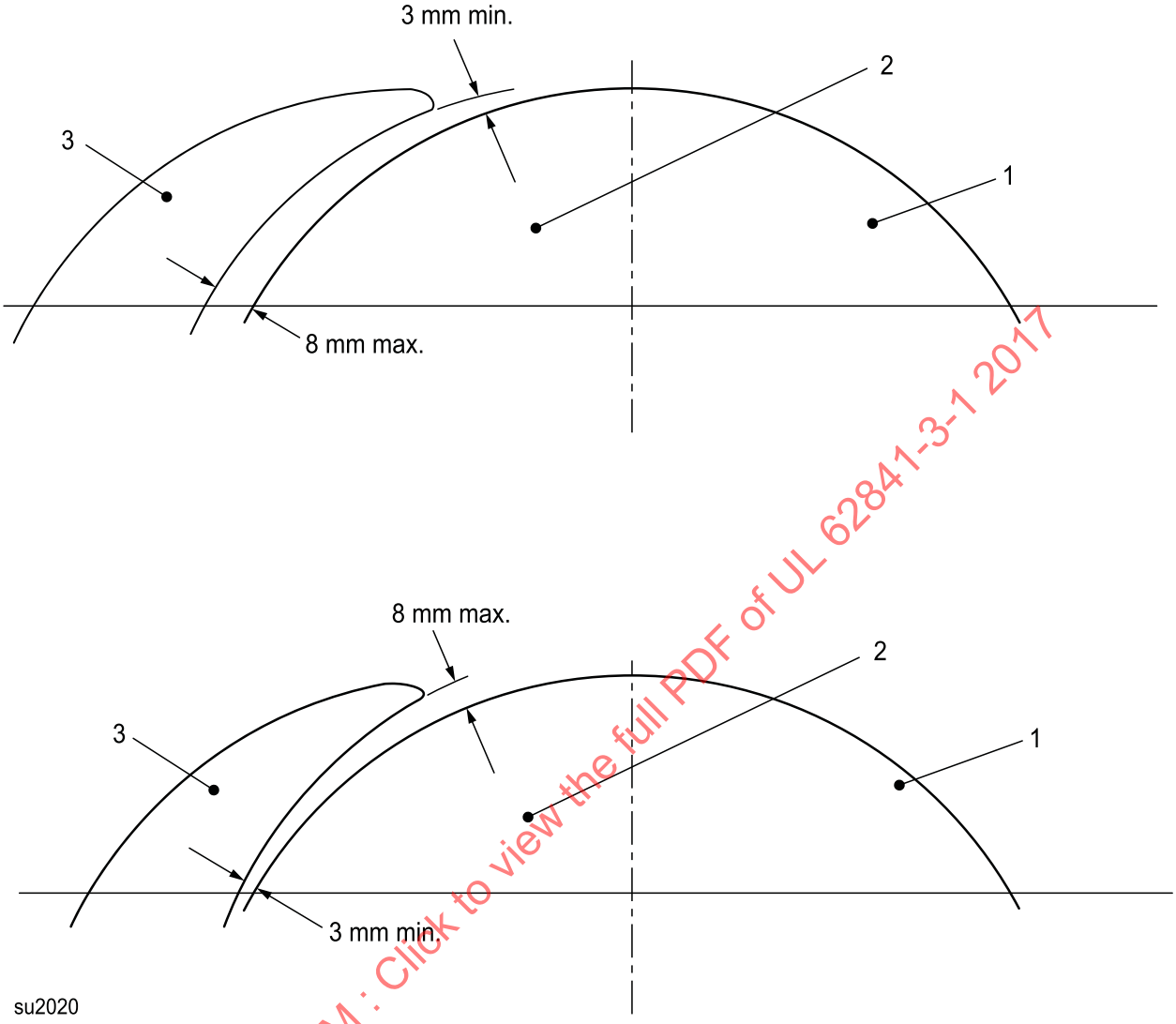
Key

1 saw blade

2 **riving knife**

3 **adjustable extended riving knife**

Figure 107 – Distance between riving knife and saw blade



Key

1 saw blade, front **quadrant**

2 saw blade, rear **quadrant**

3 **riving knife**