UL 60745-2-13

STANDARD FOR SAFETY

Hand-Held Motor-Operated Electric Tools – Safety – Part 2-13: Particular Requirements for Chain Saws

UL Standard for Safety for Hand-Held Motor-Operated Electric Tools – Safety – Part 2-13: Particular Requirements for Chain Saws, UL 60745-2-13

First Edition, Dated December 8, 2011

Summary of Topics

This revision of ANSI/UL 60745-2-13 dated June 10, 2022 is being issued to address consistency of safety instructions for chainsaws; 1DV.1, K.8.12.1.1DV

Please note that the national difference document incorporates all the U.S. national differences for UL 60745-2-13.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The revised requirements are substantially in accordance with Proposal(s) on this subject dated November 18, 2016.

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First Edition
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Underwriters Laboratories Inc.
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First Edition

Hand-Held Motor-Operated Electric Tools – Safety – Part 2-13: Particular Requirements for Chain Saws

December 8, 2011

(Title Page Reprinted: June 10, 2022)

This national standard is based on publication IEC 60745-2-13, Edition 2.1 (2011).

Commitment for Amendments

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

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This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. The technical content of IEC and ISO publications is kept under constant review by IEC and ISO. To submit a proposal for change, please send the following information to inquiries@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 June 10, 2022. The most recent designation of ANSI/UL 60745-2-13 as an American National Standard (ANSI) occurred on June 10, 2022. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

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Preface

This is the harmonized CSA Group and UL standard for Hand-Held Motor-Operated Electric Tools – Safety – Part 2-13: Particular Requirements for Chain Saws. It is the first edition of CAN/CSA C22.2 No. 60745-2-13, and the first edition of UL 60745-2-13. This harmonized standard has been jointly revised on June 10, 2022. For this purpose, CSA Group and UL are issuing revision pages dated June 10, 2022.

This harmonized standard is based on IEC Publication IEC 60745-2-13, edition 2.1 (edition 2:2006 consolidated with amendment 1:2009).

This harmonized standard was prepared by the CSA Group and Underwriters Laboratories Inc. (UL). The efforts and support of the Harmonization Working Group for the Adoption of the IEC Series of Hand-Held, Motor-Operated Tool Standards, 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 developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Application of Standard

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

CAN/CSA-C22.2 No. 60745-2-13 is to be used in conjunction with the third edition of CAN/CSA-C22.2 No. 60745-1. The requirements for chain saws are contained in this Part 2 Standard and CAN/CSA-C22.2 No. 60745-1. Requirements of this Part 2 Standard, where stated, amend the requirements of CAN/CSA-C22.2 No. 60745-1. Where a particular subclause of CAN/CSA-C22.2 No. 60745-1 is not mentioned in CAN/CSA-C22.2 No. 60745-2-13, the CAN/CSA-C22.2 No. 60745-1 subclause applies.

UL Standard 60745-2-13 is to be used in conjunction with the fourth edition of UL 60745-1. The requirements for chain saws are contained in this Part 2 Standard and UL 60745-1. Requirements of this Part 2 Standard, where stated, amend the requirements of UL 60745-1. Where a particular subclause of UL 60745-1 is not mentioned in UL 60745-2-13, the UL 60745-1 subclause applies.

Level of Harmonization

This standard adopts the IEC text with national differences.

This standard is published as an equivalent standard for CSA 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 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

Differences from the IEC are being added in order to address regulatory and safety 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 literal interpretation 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 60745-2-13, Hand-Held Motor-Operated Electric Tools – Safety – Part 2-13: Particular Requirements for Chain Saws, copyright 2011, 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.

NATIONAL DIFFERENCES

National Differences from the text of International Electrotechnical Commission (IEC) Publication 60745-2-13, Hand-Held Motor-Operated Electrical Tools – Safety – Part 2–13: Particular Requirements for Chain Saws copyright 2011 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.

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FOREWORD

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – SAFETY – PART 2-13: PARTICULAR REQUIREMENTS FOR CHAIN SAWS

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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

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

This consolidated version of IEC 60745-13 consists of the second edition (2006) [documents 61F/625/FDIS and 61F/637/RVD] and its amendment 1 (2009) [documents 116/17/FDIS and 116/18/RVD]. It bears the edition number 2.1.

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.

International Standard IEC 60745-13 has been prepared by subcommittee 61F: Safety of hand-held motor-operated electric tools, of IEC technical committee 61: Safety of household and similar electrical appliances.

The amendment modifies the present part 2-13 to ensure its conformity with the fourth edition (2006) of IEC 60745-1, Hand-held motor-operated electric tools – Safety – Part 1: General requirements

This edition constitutes a technical revision. Main changes include Clause 8: Markings and instructions, introducing detailed safety warnings; Clause 19: Mechanical hazards, with requirements for handles, hand guards, guarding of moving parts, chain catcher, spiked bumper, chain brake, computed kickback angle, guide bar cover, saw chain tension, oiler, balance and run down time; Clause 20: Mechanical strength, with requirements for handles and hand guards; Clause 21: Construction, with requirements for the insulation of knobs and handles.

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

This part 2 is to be used in conjunction with the latest edition of IEC 60745-1, *Hand-held motor-operated electric tools – Safety – Part 1: General requirements*, and its amendments. It was established on the basis of the fourth edition (2006) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60745-1.

This part 2 supplements or modifies the corresponding clauses of IEC 60745-1, so as to convert that publication into the IEC standard: Safety requirements for chain saws.

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

NOTE 2 The following numbering system is used:

– subclauses, items, tables and figures that are numbered starting from 101 are additional to those in Part 1;

– additional annexes are lettered AA, BB, etc.

NOTE 3 In this standard, the following print types are used:

– requirements: in roman type

– *test specifications: in italic type*

– notes: in smaller roman type

IEC 60745 consists of the following parts, under the general title *Hand-held motor-operated electric tools – Safety:*

Part 1: General requirements

Part 2-1: Particular requirements for drills and impact drills

Part 2-2: Particular requirements for screwdrivers and impact wrenches

Part 2-3: Particular requirements for grinders, polishers and disk-type sanders

Part 2-4: Particular requirements for sanders and polishers other than disk type

Part 2-5: Particular requirements for circular saws

Part 2-6: Particular requirements for hammers

Part 2-7: Particular requirements for spray guns for non-flammable liquids

Part 2-8: Particular requirements for shears and nibblers

Part 2-9:Particular requirements for tappers

Part 2-11: Particular requirements for reciprocating saws (jig and sabre saws)

Part 2-12: Particular requirements for concrete vibrators

Part 2-13: Particular requirements for chain saws

Part 2-14: Particular requirements for planers

Part 2-15: Particular requirements for hedge trimmers

Part 2-16: Particular requirements for tackers

Part 2-17: Particular requirements for routers and trimmers

Part 2-18: Particular requirements for strapping tools

Part 2-19: Particular requirements for jointers

Part 2-20: Particular requirements for band saws

Part 2-21: Particular requirements for drain cleaners

The committee has decided that the contents of the base publication and its amendments 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.

DV.101 DE *Addition to the part 2:*

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.

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HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – SAFETY – PART 2-13: PARTICULAR REQUIREMENTS FOR CHAIN SAWS

1 Scope

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

Addition:

This standard applies to chain saws for cutting wood and designed for use by one person. This standard does not cover chain saws designed for use in conjunction with a guide-plate and riving knife or in any other way such as with a support or as a stationary or transportable machine.

This standard does not apply to chain saws for tree service as defined in ISO 11681-2, pole cutters and pruners.

1DV D1 ***Deleted***

1DV.1 DR ***Modification: For the United States only, modify the last paragraph of Clause 1 of the Part 2 as follows:***

This standard does not apply to pole cutters and pruners.

2 Normative references

This clause of Part 1 is applicable except as follows:

Addition:

ISO 3864-3[1)]
Graphical symbols – Safety colours and safety signs – Part 3: Design criteria for graphical symbols used in safety signs

ISO 6533:2001
Forestry machinery – Portable chain-saw front hand-guard – Dimensions and clearances

ISO 6534:1992
Portable chain-saws – Hand-guards – Mechanical strength

ISO 7914:2002
Forestry machinery – Portable chain-saws – Minimum handle clearance and sizes

ISO 7915:1991
Forestry machinery – Portable chain-saws – Determination of handle strength

ISO 8334:1985
Forestry machinery – Portable chain-saws – Determination of balance

ISO 9518:1998
Forestry machinery – Portable chain-saws – Kickback test

ISO 10726:1992
Portable chain-saws – Chain catcher – Dimensions and mechanical strength

ISO 11681-2:1998
Machinery for forestry – Portable chain-saws – Safety requirements and testing – Part 2: Chain-saws for tree service

[1)] ISO 3864-3 is currently at the DIS stage.

2DV D1 *Deleted*

3 Terms and definitions

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

3.101 **chain saw:** tool designed to cut wood with a saw chain and consisting of an integrated unit of handles, motor and cutting attachment, designed to be supported with two hands (see Figure 101)

3.102 **chain brake:** device for stopping or locking the saw chain activated manually or non-manually when kickback occurs

3.103 **bar tip guard:** shield that prevents contact with the saw chain at the tip of the guide bar, for reducing the incidence of kickbacks

3.104 **chain brake lever:** device, usually the front hand guard, used to activate the chain brake

3.105 **chain catcher:** device for restraining the saw chain if it breaks or degrooves (see Figure 101)

3.106 **drive sprocket:** chain drive wheel with teeth

3.107 **front handle:** support handle located at or towards the front of the motor housing (see Figure 101)

3.108 **front hand guard:** guard between the front handle and the saw chain for protecting the hand from injuries if the hand slips off the handle (see Figure 101)

3.109 **guide bar:** part that supports and guides the saw chain (see Figure 101)

3.110 **kickback:** rapid upward and/or backward motion of the chain saw which can occur when the moving saw chain near the tip of the guide bar contacts an object such as a log or branch

3.111 **rear hand guard:** extension on the lower part of the rear handle for protecting the hand from the saw chain if it breaks or degrooves (see Figure 101)

3.112 **rear handle:** support handle located on the housing or towards the rear of the motor housing (see Figure 101)

3.113 **saw chain:** chain, serving as a cutting tool, consisting of drive links, cutters and side links, held together by rivets (see Figure 101)

3.114 **spiked bumper:** device, fitted in front of the guide bar mounting point, acting as a pivot when in contact with a tree or log (see Figure 101 and Figure 102)

3.115 **cutting length:** distance from the root of the spiked bumper, along the guide bar axis to the outside edge of the cutting link, or on the inside part of the bar tip guard with the chain tension adjuster set at mid-position (see Figure 102)

3.116 **run down time:** elapsed time from the release of the mains switch until the saw chain stops

4 General requirements

This clause of Part 1 is applicable.

5 General conditions for the tests

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

5.2 *Addition:*

For the tests of 19.113 one additional sample may be provided.

5.14 *Addition:*

For tests carried out at normal load, the saw chain and the guide bar may be removed and the drive sprocket of the chain saw loaded by means of a brake.

6 Void

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:*

Chain saws shall be marked with the following:

– maximum length of the guide bar in mm;

– identification of the direction of rotation of the saw chain by a legible and durable mark.

In addition, chain saws shall be marked with safety recommendations and warnings of the following substance which shall be written in one of the official languages of the country in which the tool is to be sold.

– "Wear eye protection" or the sign M004 of ISO 7010 or the sign specified in Annex AA;

– "Wear ear protection" or the sign M003 of ISO 7010 or the sign specified in Annex AA.

A combination of symbols, such as eye, ear and head protection, is allowed.

For chain saws with a degree of protection of less than IPX4:

– "Do not expose to rain" or the symbol specified in Annex AA.

For mains supplied tools:

– "Remove plug from the mains immediately if the cable is damaged or cut" or the symbol specified in Annex AA.

If other symbols are used they shall be in accordance with ISO 3864-3.

8.1DV D1 ***Modification: Replace Clause 8.1 of this Part 2 with the following:***

Chain saws shall be marked with the following:

– maximum length of the guide bar in mm;

– identification of the direction of rotation of the saw chain by a legible and durable mark;

– a bar and chain combination that maintains compliance with the standard.

In addition, chain saws shall be marked with safety recommendations and warnings of the following substance which shall be written in one of the official languages of the country in which the tool is to be sold.

– "Wear eye protection." or the sign M004 of ISO 7010 or the sign specified in Annex AA.

– "Wear ear protection." or the sign M003 of ISO 7010 or the sign specified in Annex AA.

The protection symbols may be modified by combining or adding other personal protective equipment such as head protection, dust mask, etc.

– Contact of the guide bar tip with any object should be avoided. The signs specified in Annex AA may additionally be provided.

– Tip contact can cause the guide bar to move suddenly upward and backward, which can cause serious injury. The signs specified in Annex AA may additionally be provided.

– Always use two hands when operating the chain saw. The signs specified in Annex AA may additionally be provided.

For chain saws with a degree of protection of less than IPX4:

– "Do not expose to rain." or the sign specified in Annex AA may additionally be provided.

For mains supplied tools:

– "Remove plug from the mains immediately if the cable is damaged or cut." The sign specified in Annex AA may additionally be provided.

8.12.1.1 *Addition:*

Chain saw safety warnings:

• **Keep all parts of the body away from the saw chain when the chain saw is operating. Before you start the chain saw, make sure the saw chain is not contacting anything.** *A moment of inattention while operating chain saws may cause entanglement of your clothing or body with the saw chain.*

• **Always hold the chain saw with your right hand on the rear handle and your left hand on the front handle.** *Holding the chain saw with a reversed hand configuration increases the risk of personal injury and should never be done.*

NOTE For chain saws designed with the guide bar on the left side, the reference to "right hand" and "left hand" positioning is reversed.

• **Hold the power tool by insulated gripping surfaces only, because the saw chain may contact hidden wiring or its own cord.** *Saw chains contacting a "live" wire may make exposed metal parts of the power tool "live" and could give the operator an electric shock.*

• **Wear safety glasses and hearing protection. Further protective equipment for head, hands, legs and feet is recommended.** *Adequate protective clothing will reduce personal injury by flying debris or accidental contact with the saw chain.*

• **Do not operate a chain saw in a tree.** *Operation of a chain saw while up in a tree may result in personal injury.*

• **Always keep proper footing and operate the chain saw only when standing on fixed, secure and level surface.** *Slippery or unstable surfaces such as ladders may cause a loss of balance or control of the chain saw.*

• **When cutting a limb that is under tension be alert for spring back.** *When the tension in the wood fibres is released the spring-loaded limb may strike the operator and/or throw the chain saw out of control.*

• **Use extreme caution when cutting brush and saplings.** *The slender material may catch the saw chain and be whipped toward you or pull you off balance.*

• **Carry the chain saw by the front handle with the chain saw switched off and away from your body. When transporting or storing the chain saw always fit the guide bar cover.** *Proper handling of the chain saw will reduce the likelihood of accidental contact with the moving saw chain.*

• **Follow instructions for lubricating, chain tensioning and changing accessories.** *Improperly tensioned or lubricated chain may either break or increase the chance for kickback.*

• **Keep handles dry, clean, and free from oil and grease.** *Greasy, oily handles are slippery causing loss of control.*

• **Cut wood only. Do not use chain saw for purposes not intended. For example: do not use chain saw for cutting plastic, masonry or non-wood building materials.** *Use of the chain saw for operations different than intended could result in a hazardous situation.*

Causes and operator prevention of kickback:

Kickback may occur when the nose or tip of the guide bar touches an object, or when the wood closes in and pinches the saw chain in the cut.

Tip contact in some cases may cause a sudden reverse reaction, kicking the guide bar up and back towards the operator.

Pinching the saw chain along the top of the guide bar may push the guide bar rapidly back towards the operator.

Either of these reactions may cause you to lose control of the saw which could result in serious personal injury. Do not rely exclusively upon the safety devices built into your saw. As a chain saw user, you should take several steps to keep your cutting jobs free from accident or injury.

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

• **Maintain a firm grip, with thumbs and fingers encircling the chain saw handles, with both hands on the saw and position your body and arm to allow you to resist kickback forces.** *Kickback forces can be controlled by the operator, if proper precautions are taken. Do not let go of the chain saw.*

NOTE A possible illustration for this warning is given in Figure 103.

• **Do not overreach and do not cut above shoulder height.** *This helps prevent unintended tip contact and enables better control of the chain saw in unexpected situations.*

• **Only use replacement bars and chains specified by the manufacturer.** *Incorrect replacement bars and chains may cause chain breakage and/or kickback.*

• **Follow the manufacturer's sharpening and maintenance instructions for the saw chain.** *Decreasing the depth gauge height can lead to increased kickback.*

8.12.2 a) *Addition:*

101) Explanation of the safety devices that the chain saw incorporates as part of the original equipment and/or other safety devices that are recommended in the instruction manual

102) Instructions for properly installing and adjusting the guide bar and saw chain

103) An explanation of the safety devices that the chain saw incorporates as part of the original equipment and/or other safety devices that are recommended in the instruction manual

8.12.2DV D1 *Modification: Add the following item to Clause 8.12.2(a) of this Part 2:*

103A) Recommended bar and chain combination(s) that can be used and that maintains compliance with this standard.

8.12.2 b) *Addition:*

101) Recommendation for the use of a residual current device with a tripping current of 30 mA or less

102) Statement to position the cord so that it will not be caught on branches and the like, during cutting

103) Recommendation that the first-time user should, as a minimum practice, cutting logs on a saw-horse or cradle

104) Instructions to explain the proper techniques for making the basic felling, limbing, and cross-cutting. Examples for the required instructions are given in Annex BB.1to BB.5

105) If a manual oiler control is provided, instructions regarding its use

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, except as follows:

12.4 *Replacement:*

The tool is operated at rated input or rated current for 30 min. The temperature rises are measured at the end of the 30 min.

13 Leakage current

This clause of Part 1 is applicable.

14 Moisture resistance

This clause of Part 1 is applicable.

15 Electric strength

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, except as follows:

17.2 *Addition:*

The saw chain is removed for the endurance test.

18 Abnormal operation

This clause of Part 1 is applicable.

19 Mechanical hazards

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

19.1 *Addition:*

The requirements of this subclause do not apply to those moving parts and guards which are separately covered by 19.102, 19.103 and 19.104.

19.101 Handles

Chain saws shall be fitted with at least two handles to provide safe control. The gripping length of the front handle shall be at least 100 mm.

The handle surfaces shall be so designed and shaped that firm grip may be applied.

Minimal clearances and sizes of the handles shall be in accordance with ISO 7914.

Compliance is checked by inspection and measurement.

19.101DV D2 *Modification: Replace the third paragraph of Clause 19.101 of this Part 2 with the following:*

Minimal clearances and sizes of the handles shall be in accordance with ISO 7914. For chain saws with a maximum no-load speed not exceeding 8 m/s and a maximum cutting length not exceeding 300 mm, the dimension D in Table 1 of ISO 7914 may be reduced to a minimum of 125 mm.

19.102 Front hand guard

A guard shall be fitted in the vicinity of the front handle to protect the operator's fingers from injury by contact with the saw chain. The dimensions and clearances of this front hand guard shall comply with ISO 6533.

Compliance is checked by inspection and measurement.

19.103 Rear hand guard

The hand of the operator shall be protected in case the saw chain breaks or derails. A hand guard shall be provided along the length of the bottom of the rear handle. This guard shall extend from the edge of the handle for at least 30 mm at the guide bar side and at least 100 mm lengthwise (see Figure 104).

Compliance is checked by inspection and measurement.

19.104 Guarding of the moving parts

The drive sprocket and the saw chain behind the spiked bumper shall be guarded to prevent access from both sides and from the top and the rear.

Compliance is checked by means of the straight test probe (see Figure 105). It shall not be possible to touch the drive sprocket and the part of the saw chain behind the spiked bumper with the test probe.

There may be openings at the front and below the drive sprocket to allow the ejection of wood chips and to adjust the guide bar and saw chain.

Compliance is checked by inspection.

19.105 **Chain catcher**

The chain saw shall be fitted with a chain catcher device placed under the saw chain as far to the front as practicable. The chain catcher shall extend sideways at least 5 mm from the centre-plane of the guide bar.

The chain catcher shall have sufficient mechanical strength.

Compliance is checked by inspection and applying Clauses 3 and 4 of ISO 10726. In 4.1 of ISO 10726, a temperature of (-10 ±3) °C shall apply.

19.106 **Spiked bumper**

Chain saws shall have a spiked bumper at the front of the machine.

Compliance is checked by inspection.

19.107 **Chain brake**

If a chain brake operated by a chain brake lever is needed as a part of the anti-kickback system in order to meet the requirements of 19.108, it shall also comply with the requirements of 19.107.1 and 19.107.2.

19.107.1 The chain brake shall stop the saw chain with an average braking time not exceeding 0,12 s and a maximum braking time not exceeding 0,15 s.

Compliance is checked by the following test.

The chain saw and chain tension shall be adjusted as for normal use, following the manufacturer's instruction. The chain tension shall generally be adjusted so that, when a 1 kg mass is hanging from the centre of the cutting length along the lower portion of the chain, the gap between the chain side link and the guide bar is a minimum of 0,017 mm per millimetre of guide bar length.

With the saw chain lubricated as in normal use and operated at rated voltage, the brake actuator is set in motion by the impact of a pendulum. This pendulum shall have a mass of 0,70 kg, a hammer with a flat strike face of 50 mm diameter and an arm of 700 mm length. The release height of the pendulum shall be 200 mm. The time for the saw chain to stop shall be measured from the moment of impact with the actuator (see Figure 106).

The chain brake shall be operated a total of 25 times. The maximum stopping time and the average stopping time of the saw chain shall be measured at the first five and the last five braking operations.

The chain saw is considered to be stopped when the time taken for two successive teeth to pass a fixed point exceeds 10 ms.

The interval between each operation shall be 2 min consisting of a no-load running period of 1 min prior to each impact of the pendulum. Immediately after the operation of the chain brake and the chain has stopped, the chain saw shall be switched off for the remaining time of the interval. The chain brake actuation mechanism shall be reset during this off period.

19.107.2 The chain brake lever shall be designed so that the static release force required is not more than 60 N and not less than 20 N.

Compliance is checked by the following test.

With the chain saw not running, the force on the chain brake lever needed to activate the brake shall be measured at the centre of the top (horizontal) part of the chain brake lever and in the direction of 45° forward and downward in relation to the guide bar centreline, see Figure 107.

The force shall be applied at a uniform rate.

19.108 **Kickback protection**

Chain saws shall either be equipped with a bar tip guard which is not removable such as riveted, spot welded, etc. or a computed kickback angle or chain stop angle, whichever is less, shall not exceed 45°.

The bar tip guard, if any, shall protect the periphery and both sides of the saw chain at the tip of the guide bar. The bar tip guard shall be designed to prevent contact of any part of the saw chain with the workpiece within the angle α between the longitudinal axis of the guide bar and the surface of the workpiece between 45° and 135°, see Figure 108.

Compliance is checked by inspection, measurement and in accordance with the kickback requirements of ISO 9518.

19.108DV D2 *Modification: Replace the first paragraph of Clause 19.108 of this Part 2 with the following:*

Chain saws shall have a computed kickback angle or chain stop angle, whichever is less, not exceeding 45°. A bar tip guard, even if it is not removable (riveted, spot welded, etc.), shall be removed for testing.

19.109 **Guide bar cover**

A protective cover shall be provided with the chain saw to cover the guide bar in order to prevent injuries during transportation. The cover shall not become detached when the guide bar is in vertical downward position.

Compliance is checked by inspection.

19.110 **Saw chain tension**

Chain saws shall be provided with means of tensioning the saw chain.

Compliance is checked by inspection.

19.111 **Saw chain lubrication**

The chain saw shall be provided with an oiler for the saw chain.

If the chain saw is fitted with a manual oiler, it shall be so located that it can be operated while holding the saw in both hands in a normal operating position.

Compliance is checked by inspection.

19.112 **Balance**

Chain saws shall be in longitudinal balance.

Compliance is checked by the following test in accordance with ISO 8334.

The chain saw shall be fitted with a supply cord 1 000 mm in length with a plug as provided by the manufacturer and guide bar and chain with the dimensions recommended by the manufacturer. The oil tank shall be half full. The spiked bumper shall be fitted.

The chain saw shall be suspended from the front handle gripping area "a" (see Figure 109) at the point giving the best lateral balance. During the test the supply cord shall hang down without contacting any other surface.

The angle between the centreline of the guide bar and the horizontal plane shall not exceed 30°.

19.113 **Run down time**

The run down time of chain saws shall be limited.

Compliance is checked by the following test.

The chain saw is adjusted in accordance with the manufacturer's recommendations.

The chain saw shall be run in before starting the test by actuating 10 "on"/"off" cycles. One cycle consists of 30 s running and 30 s rest.

After the run-in, the saw chain tension shall be adjusted according to the manufacturer's recommendations.

The test is made under no-load. The test sequence shall consist of a total of 2 500 cycles.

The run down time of the chain shall not exceed 2 s for the first 6 cycles of operation and shall not exceed 3 s for the final 6 cycles of the test sequence.

The time measurement starts after opening the switch contacts. The chain is considered to be stopped when the time taken for two successive teeth to pass a fixed point exceeds 10 ms.

NOTE The run down time will be considered in the future with the goal of reducing the run down time to a lower value without impairing the overall safety of the tool.

20 Mechanical strength

This clause of Part 1 is applicable.

20.101 **Handles**

The handles shall be of durable construction and capable of withstanding stress and impact sustained in normal working conditions.

Compliance is checked by the test of ISO 7915, where the values for "≤ 50 cm^3" shall apply.

20.102 **Front and rear hand guard**

The front and rear hand guard shall be of durable construction and capable of withstanding impacts sustained in normal working conditions.

Compliance is checked by applying the dynamic and durability tests of ISO 6534.

21 Construction

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

21.18.1 *Replacement:*

The mains switch shall automatically switch off the motor as soon as the actuating member of the switch is released.

This switch shall have no locking arrangement in the "on" position.

Compliance is checked by inspection.

21.18.2 *Replacement:*

To prevent inadvertent operation the chain saw shall be so designed that two separate and dissimilar actions are required before the cutting means starts moving.

The saw chain shall only be able to move, when the chain brake lever is deactivated.

Compliance is checked by inspection.

22 Internal wiring

This clause of Part 1 is applicable.

23 Components

This clause of Part 1 is applicable.

24 Supply connection and external flexible cords

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

24.1DV D1 *Modification: Replace Clause 24.1DV of the Part 1 with the following:*

The supply cable shall have a length not less than 200 mm but not greater than 500 mm long.

24.2DV DR *Modification: Add the following to Clause 24.2 of the Part 1:*

The attachment plug on the supply cord shall be constructed so that, when inserted in the connector of an extension cord, the blades will not be energized until they are inaccessible to contact.

Compliance shall be checked by the following test.

The receptacle shall be connected to the extension cord of the test assembly illustrated in Figure 101.DV with the plug inserted in the receptacle as far as possible. The plug shall be withdrawn not more than the distance necessary to permit the test probe to be inserted between the plug body and the extension cord receptacle. The test probe shall be inserted with a force of 18 N (4,1 lb) or less, until the probe contacts one blade of the plug. While the probe is in contact with the blade, the electrical continuity shall be determined by an ohmmeter or similar instrument between the contacts of the extension cord receptacle and the test probe. The test probe shall not contact any current-carrying blade of the attachment plug while the plug is conductively connected to the connector of the extension cord. The test shall be repeated for the other blade of the attachment plug.

24.4 *Modification:*

Supply cords shall not be lighter than heavy polychloroprene sheathed flexible cable (code designation 60245 IEC 66) or equivalent.

Compliance is checked by inspection.

24.4DV DR *Modification: Replace Clause 24.4 of this Part 2 with the following:*

Supply cords shall be not lighter than type SJOW, SJTW, or the equivalent that is oil and weather resistant in accordance with the National Electrical Code, ANSI/NFPA 70, and the Canadian Electric Code, Part I, CSA C22.1.

25 Terminals for external conductors

This clause of Part 1 is applicable.

26 Provision for earthing

This clause of Part 1 is applicable.

27 Screws and connections

This clause of Part 1 is applicable.

28 Creepage distances, clearances and distances through insulation

This clause of Part 1 is applicable.

29 Resistance to heat, fire and tracking

This clause of Part 1 is applicable.

30 Resistance to rusting

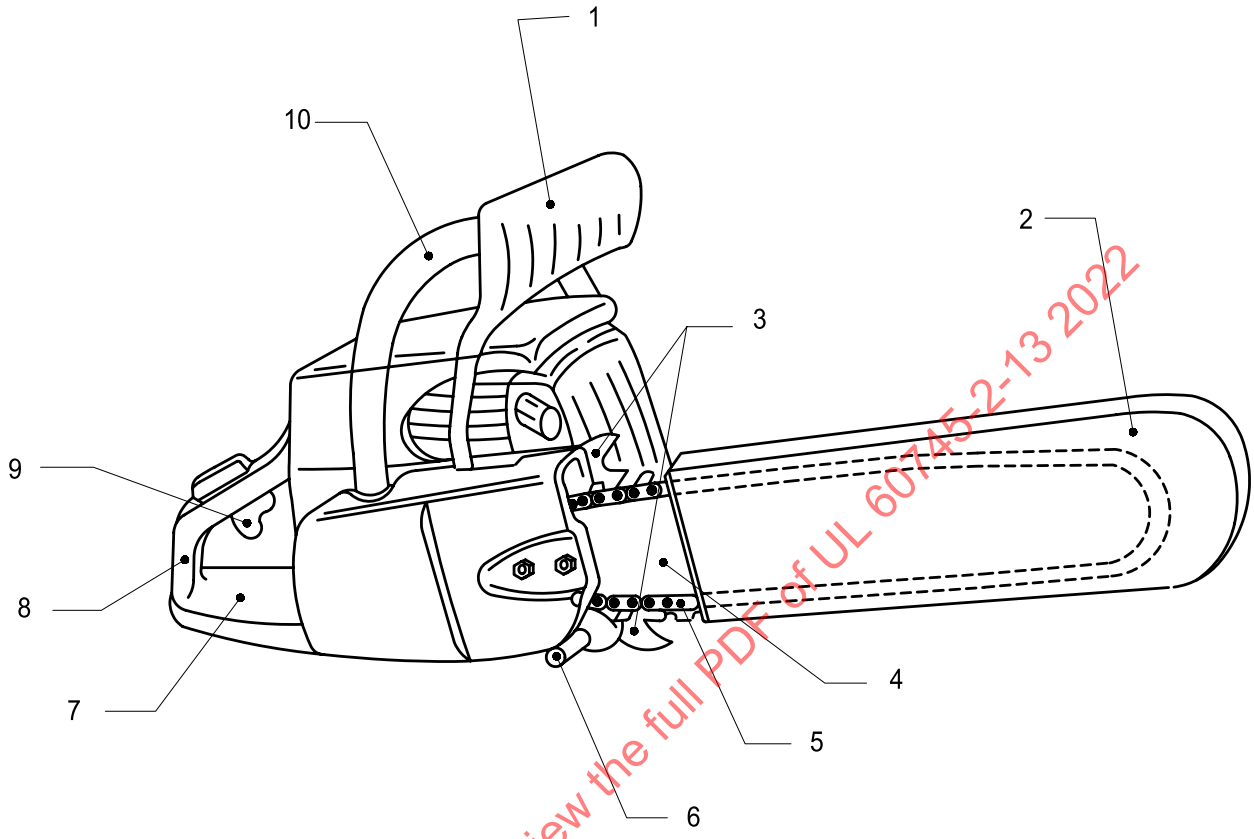
This clause of Part 1 is applicable.

31 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

Figure 101

Chain saw nomenclature



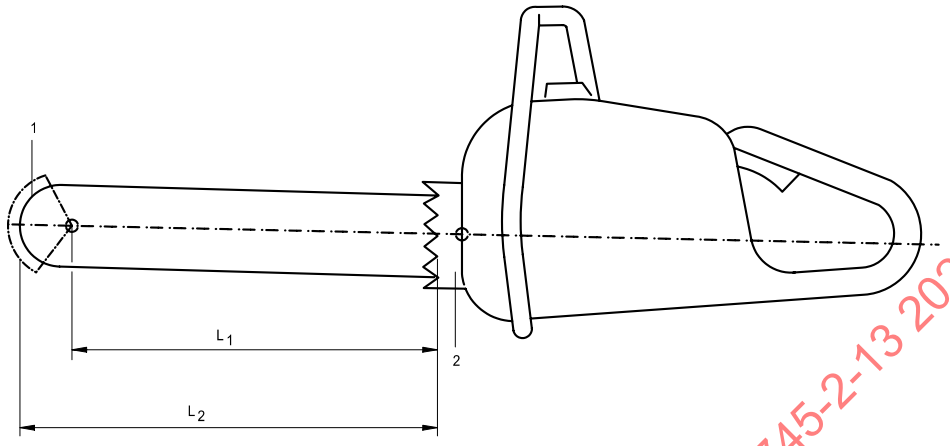
S5567

Key

1 Front hand guard
2 Guide bar cover
3 Spiked bumper
4 Guide bar
5 Saw chain
6 Chain catcher
7 Rear hand guard
8 Rear handle
9 Switch trigger
10 Front handle

Figure 102

Cutting length



S5568

Key

1 Bar tip guard

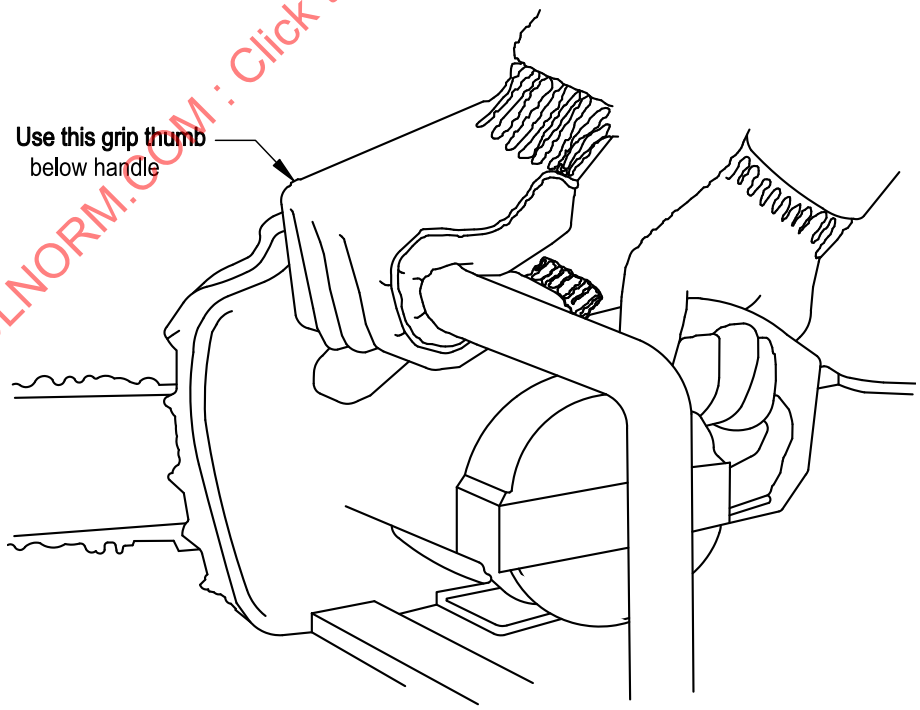
2 Spiked bumper

L1 Cutting length with bar tip guard

L2 Cutting length without bar tip guard

Figure 103

Holding the chain saw



S5569

Figure 104

Minimum rear hand guard dimensions

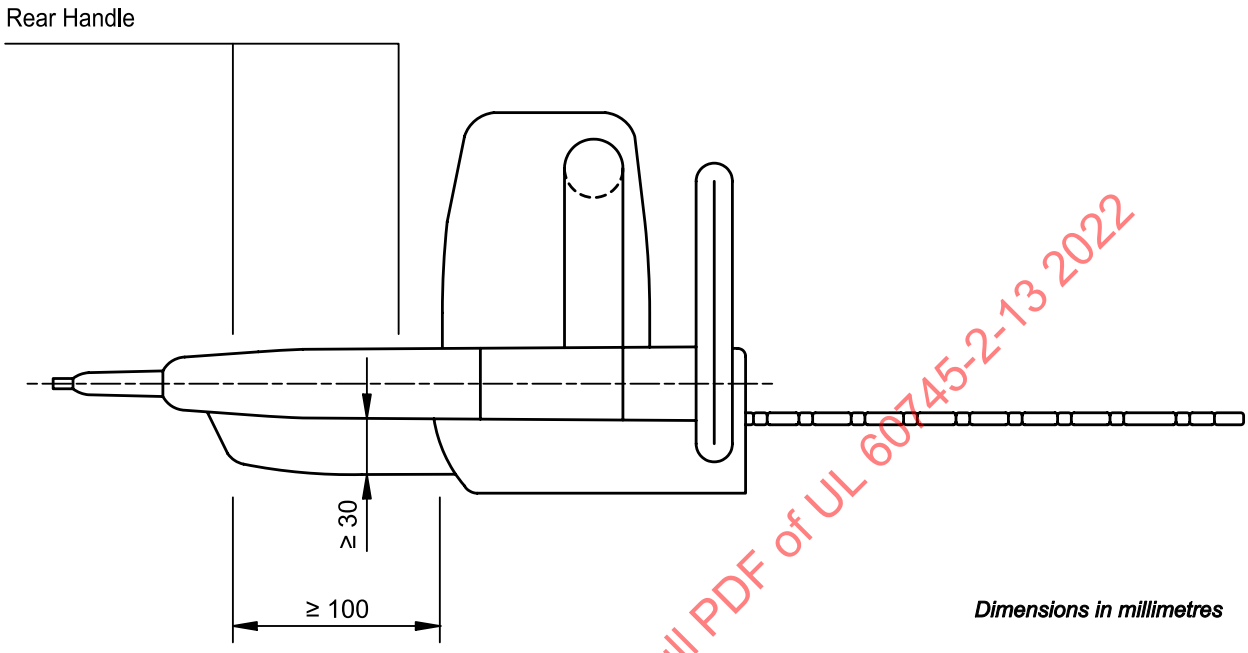
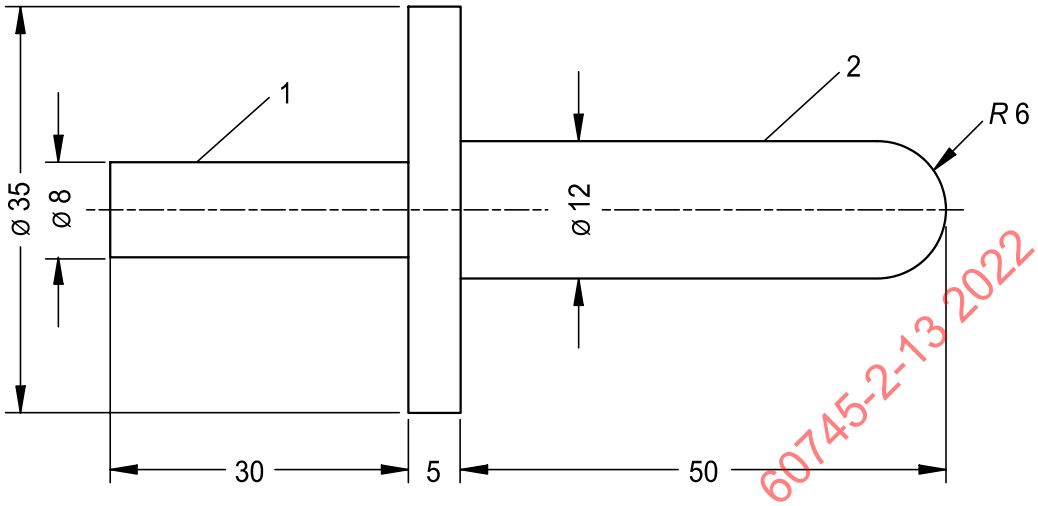


Figure 105

Straight test probe



Dimensions in millimetres

S5571

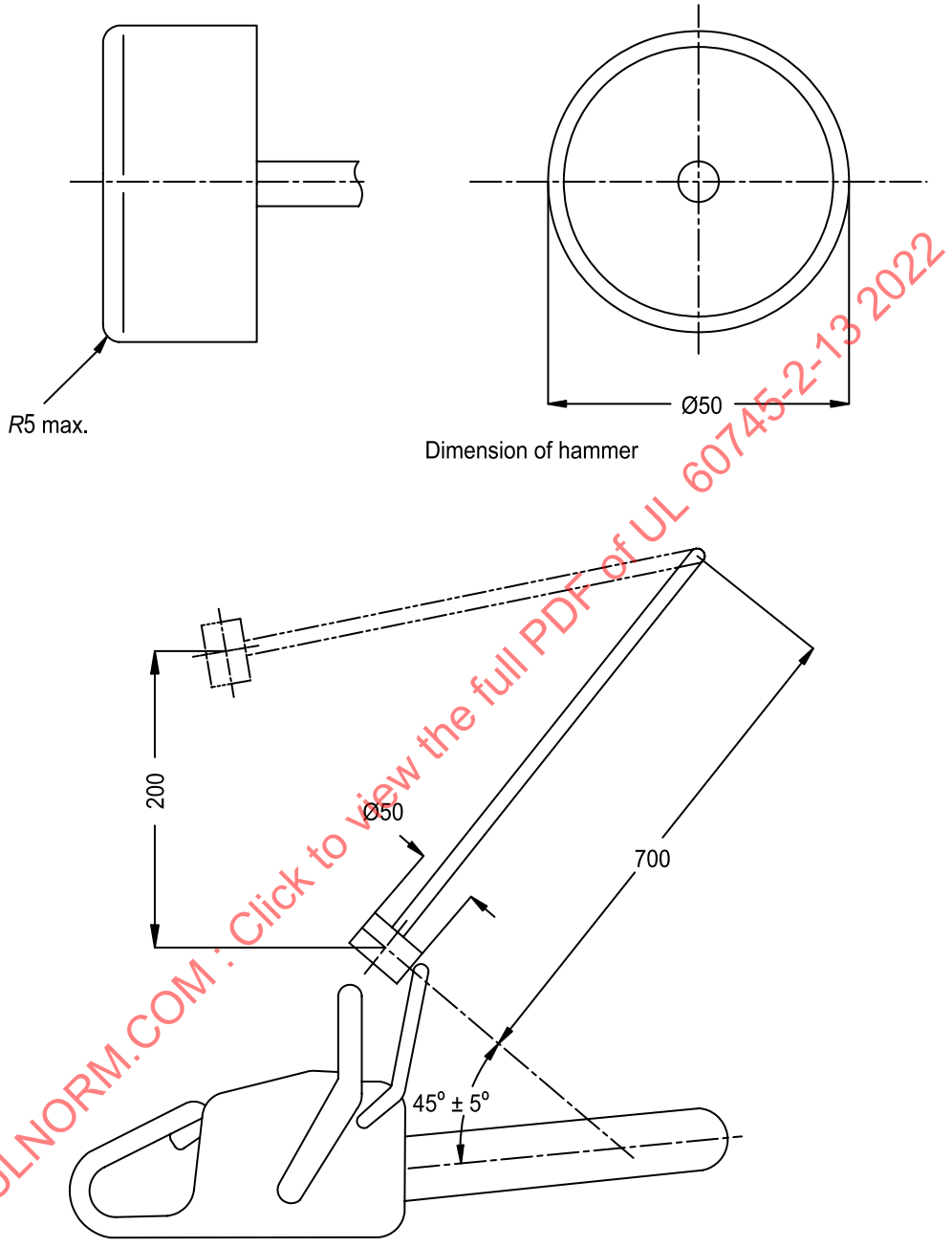
Key

1 Handle section

2 Test section

Figure 106

Chain brake test

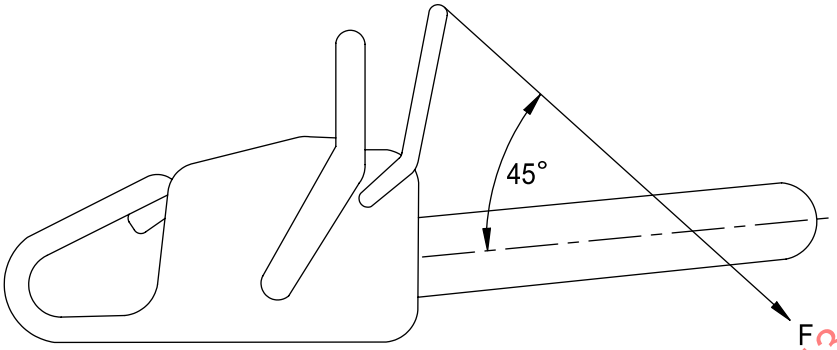


S5572

Dimensions in millimetres

Figure 107

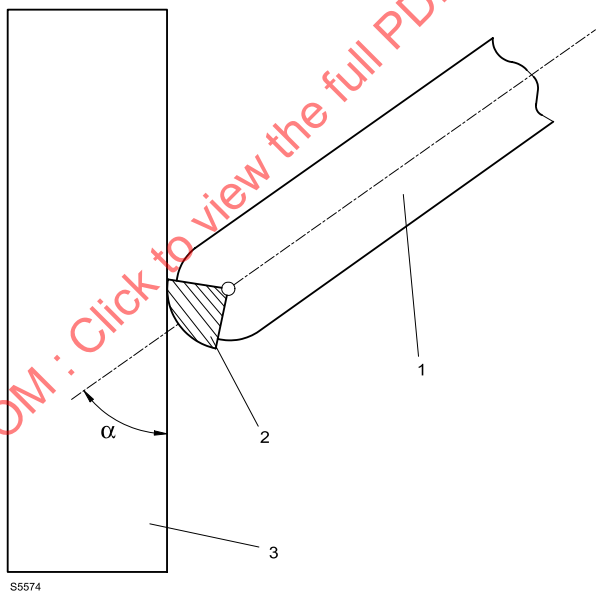
Static test for release force



S5573

Figure 108

Bar tip guard



Key

1 Guide bar

2 Bar tip guard

3 Workpiece

Figure 109

Handle gripping area

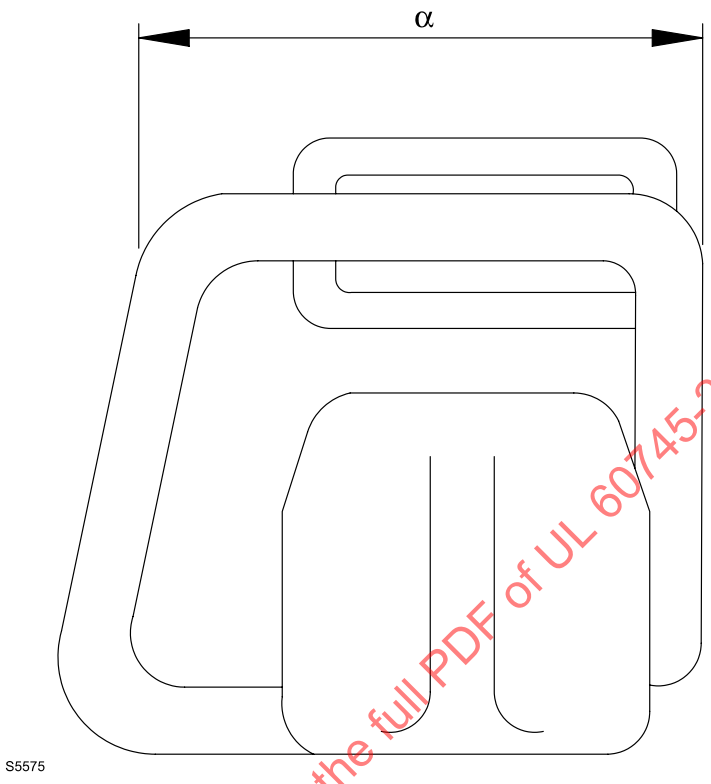
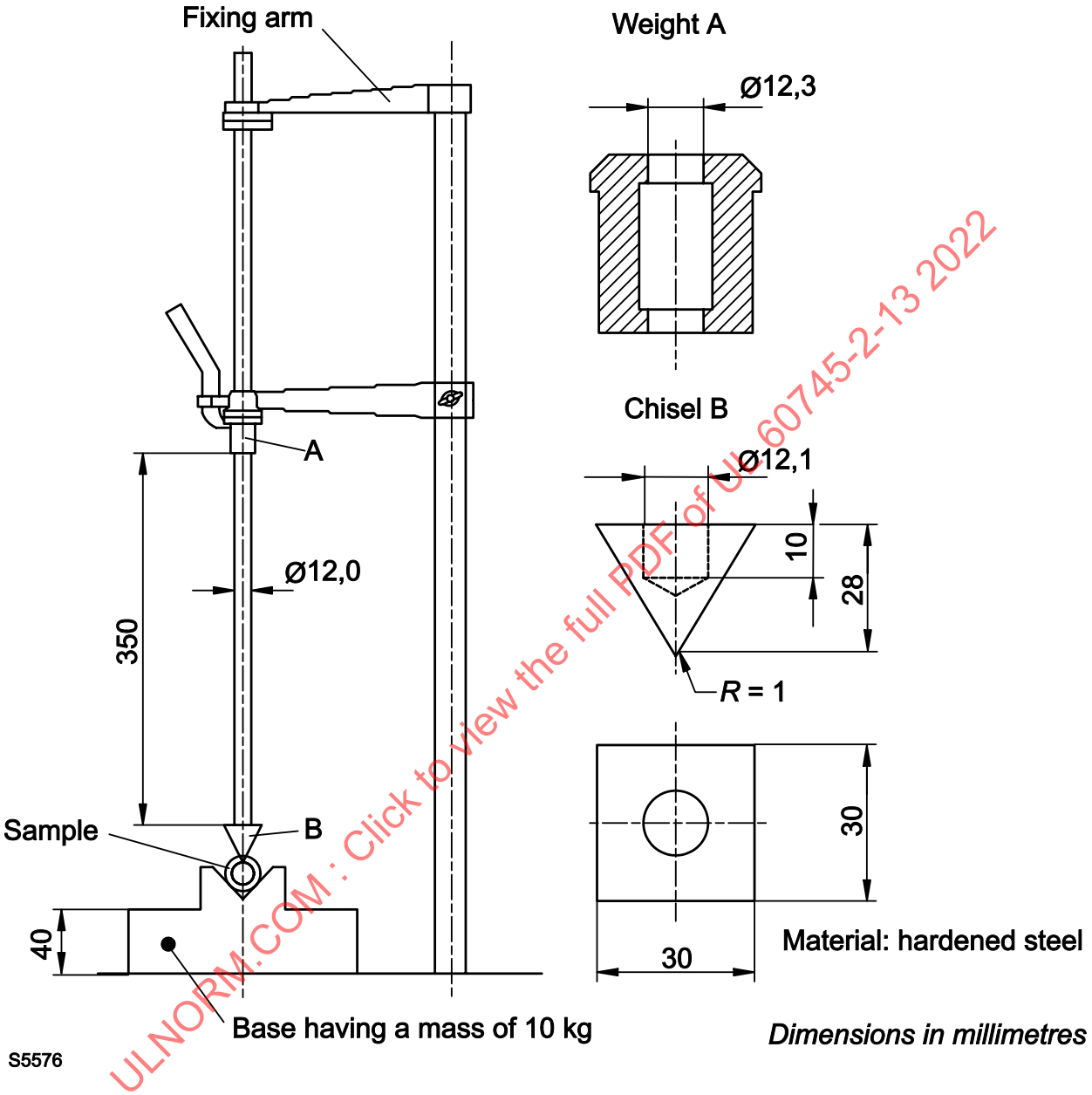


Figure 110

Impact text fixture for handle insulation

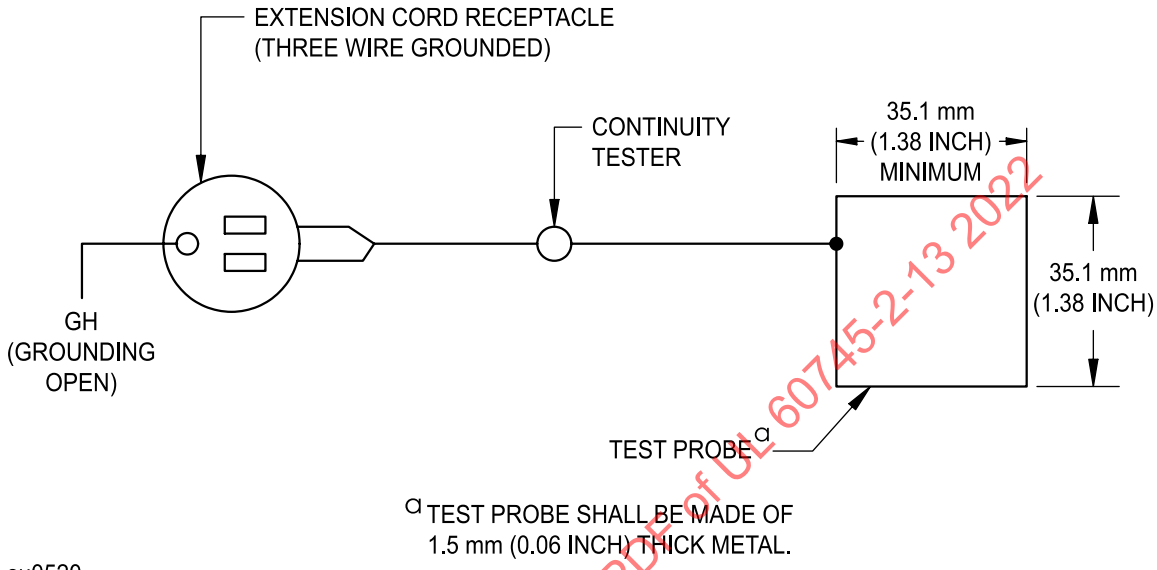


Dimensions in millimetres

101.DV DR *Add Figure 101.DV to this Part 2:*

Figure 101.DV

Test assembly for accessibility of attachment-plug blades



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Annexes

The annexes of Part 1 are applicable except as follows:

Annex K
(normative)

Battery tools and battery packs

K.1 *Addition:*

All clauses of this part 2 apply unless otherwise specified in this annex.

K.8.1 *Modification:*

The last indent, "Remove plug from the mains immediately if the cable is damaged or cut" is not applicable for battery tools.

K.8.12.1.1 *Replacement of the 3rd bullet of part 2:*

• **Hold the power tool by insulated gripping surfaces only, because the saw chain may contact hidden wiring.** *Saw chains contacting a "live" wire may make exposed metal parts of the power tool "live" and could give the operator an electric shock.*

K.8.12.1.1DV DR *Modification: Replace the 5th bullet of Clause 8.12.1.1 in the Part 2 with the following:*

• Do not operate a chain saw on a ladder, from a rooftop, or on any unstable support. *Operation of a chain saw in this manner could result in serious personal injury.*

• Do not operate a chain saw in a tree unless you have been specifically trained to do so. *Operation of a chain saw in a tree without proper training could increase the risk of serious personal injury.*

K.8.12.2 **b)** Items 101) and 102) in part 2 are not applicable.

K.12.4 This subclause of part 2 is not applicable.

K.17.2 This subclause of part 2 is not applicable.

K.19.112 **Balance**

Replacement of the 4th paragraph:

The chain saw shall be suspended from the front handle gripping area “a” (see Figure 109) at the point giving the best lateral balance. During the test, the battery pack shall be installed in the tool.

K.24.4 This subclause of part 2 is not applicable.

KDV.1 DR *Modification: Add the following to Annex K of the Part 2:*

For a battery-operated top-handle chain saw, the requirements in this annex and in Annex 101.DVA apply.

KDV.2 DR *Modification: Add the following to Annex K of the Part 2:*

For a battery-operated pruning saw, the requirements in this annex and in Annex 101.DVB apply.

Annex L
(normative)

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

L.1 *Addition:*

All clauses of this part 2 apply unless otherwise specified in this annex.

L.19.112 **Balance**

Replacement of the 4th paragraph:

The chain saw shall be suspended from the front handle gripping area "a" (see Figure 109) at the point giving the best lateral balance. Depending upon the design of the tool, the test shall be conducted under the following applicable conditions:

- with the supply cord removed and the battery pack installed in the tool;
- with the supply cord attached and hanging down without contacting any other surface and the battery pack removed from the tool;
- with the supply cord attached and hanging down without contacting any other surface and the battery pack installed in the tool.

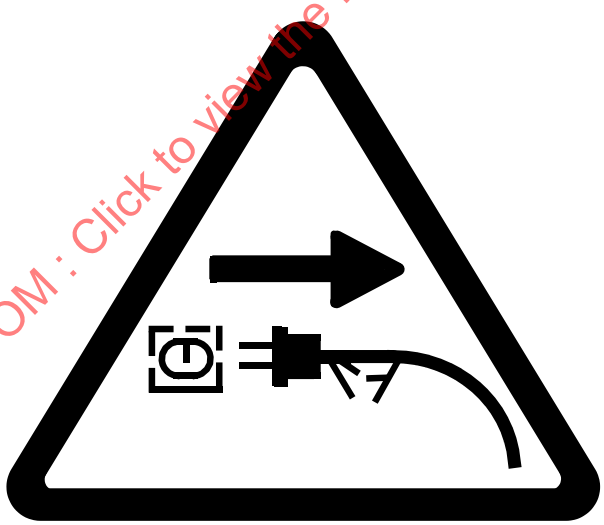
Annex AA
(normative)

Symbols for safety recommendations and warnings

1. Do not expose to rain.

S5577

2. Remove plug from the mains immediately if the cable is damaged or cut



3. Wear eye protection.

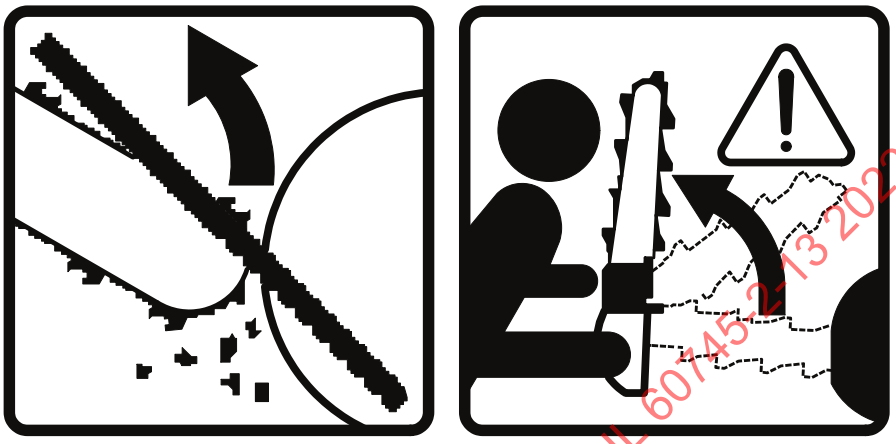
su0995

4. Wear ear protection.

su0996

AADV D1 ***Addition: Add Clauses 5 and 6 to Annex AA of this Part 2:***

5 "Contact of the guide bar tip with any object should be avoided" and "Tip contact can cause the guide bar to move suddenly upward and backward, which can cause serious injury".



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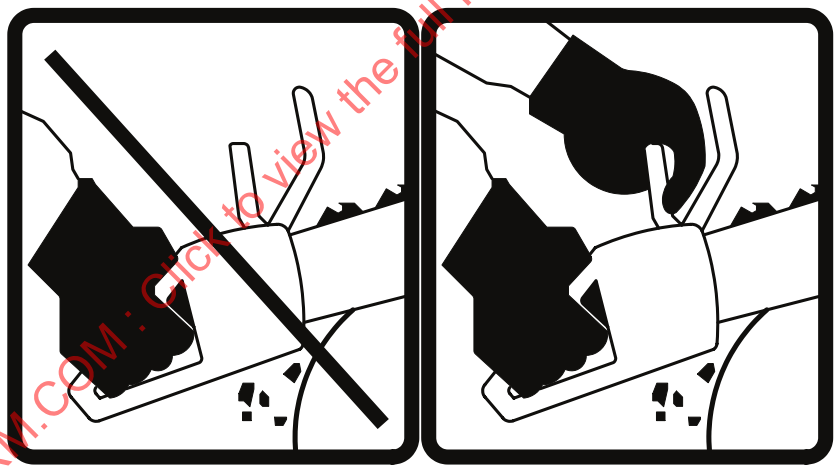
6 "Always use two hands when operating the chain saw".



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Annex BB
(informative)

Instructions concerning the proper techniques for basic felling, limbing, and cross-cutting

BB.1 Felling a tree

When bucking and felling operations are being performed by two or more persons at the same time, the felling operations should be separated from the bucking operation by a distance of at least twice the height of the tree being felled. Trees should not be felled in a manner that would endanger any person, strike any utility line or cause any property damage. If the tree does make contact with any utility line, the company should be notified immediately.

The chain saw operator should keep on the uphill side of the terrain as the tree is likely to roll or slide downhill after it is felled.

An escape path should be planned and cleared as necessary before cuts are started. The escape path should extend back and diagonally to the rear of the expected line of fall as illustrated in Figure BB.101.

Before felling is started, consider the natural lean of the tree, the location of larger branches and the wind direction to judge which way the tree will fall.

Remove dirt, stones, loose bark, nails, staples and wire from the tree.

BB.2 Notching undercut

Make the notch 1/3 the diameter of the tree, perpendicular to the direction of falls as illustrated in Figure BB.102. Make the lower horizontal notching cut first. This will help to avoid pinching either the saw chain or the guide bar when the second notch is being made.

BB.3 Felling back cut

Make the felling back cut at least 50 mm higher than the horizontal notching cut as illustrated in Figure BB.102. Keep the felling back cut parallel to the horizontal notching cut. Make the felling back cut so enough wood is left to act as a hinge. The hinge wood keeps the tree from twisting and falling in the wrong direction. Do not cut through the hinge.

As the felling gets close to the hinge, the tree should begin to fall. If there is any chance that the tree may not fall in desired direction or it may rock back and bind the saw chain, stop cutting before the felling back cut is complete and use wedges of wood, plastic or aluminium to open the cut and drop the tree along the desired line of fall.

When the tree begins to fall remove the chain saw from the cut, stop the motor, put the chain saw down, then use the retreat path planned. Be alert for overhead limbs falling and watch your footing.

BB.4 Limbing a tree

Limbing is removing the branches from a fallen tree. When limbing leave larger lower limbs to support the log off the ground. Remove the small limbs in one cut as illustrated in Figure BB.103. Branches under tension should be cut from the bottom up to avoid binding the chain saw.

BB.5 Bucking a log

Bucking is cutting a log into lengths. It is important to make sure your footing is firm and your weight is evenly distributed on both feet. When possible, the log should be raised and supported by the use of limbs, logs or chocks. Follow the simple directions for easy cutting.

When the log is supported along its entire length as illustrated in Figure BB.104, it is cut from the top (overbuck).

When the log is supported on one end, as illustrated in Figure BB.105, cut 1/3 the diameter from the underside (underbuck). Then make the finished cut by overbucking to meet the first cut.

When the log is supported on both ends, as illustrated in Figure BB.106, cut 1/3 the diameter from the top (overbuck). Then make the finished cut by underbucking the lower 2/3 to meet the first cut.

When bucking on a slope always stand on the uphill side of the log, as illustrated in Figure BB.107. When "cutting through", to maintain complete control release the cutting pressure near the end of the cut without relaxing your grip on the chain saw handles. Don't let the chain contact the ground. After completing the cut, wait for the saw chain to stop before you move the chain saw. Always stop the motor before moving from tree to tree.

Figure BB.101

Description of felling: escape routes

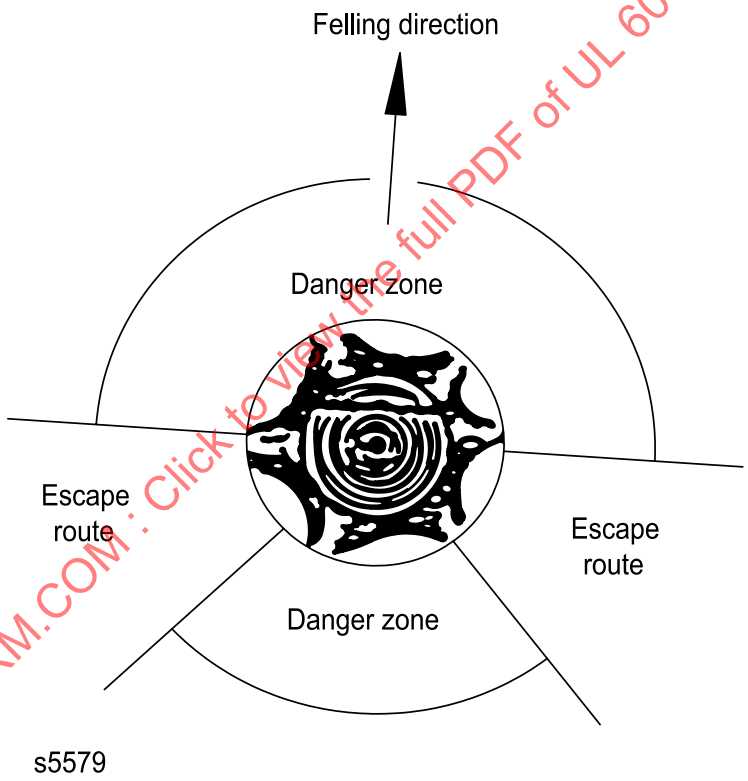
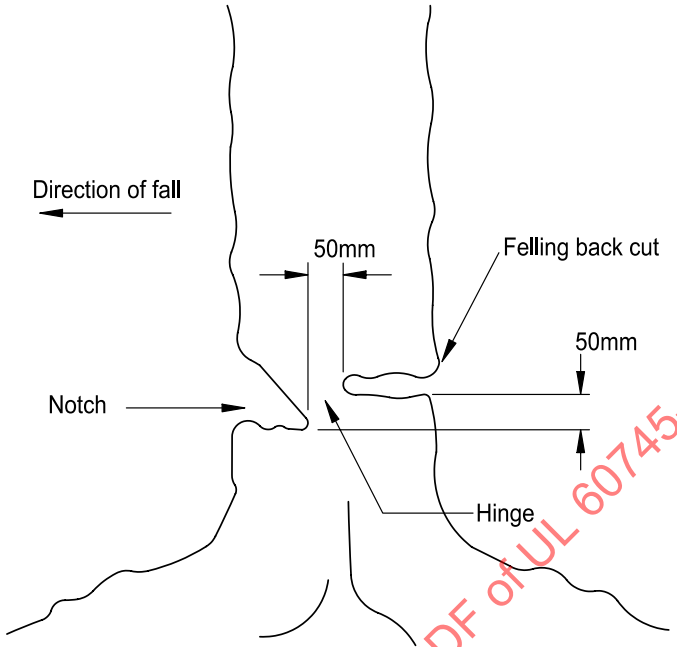


Figure BB.102

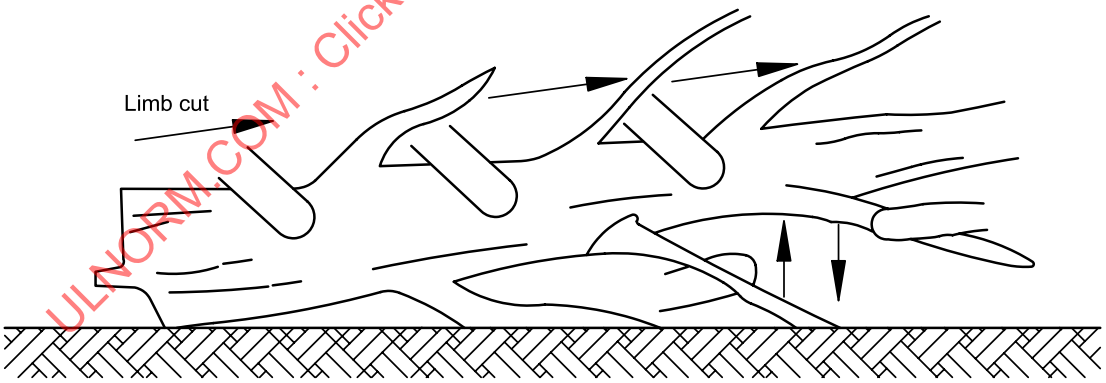
Description of felling: undercutting



s5580

Figure BB.103

Tree limbing



Keep work off ground leave support limbs until log is cut

s5581