

Hand-held motor-operated electric tools — Safety —

Part 2-5: Particular requirements for circular saws

ICS 25.140.20; 25.140.30

National foreword

This British Standard is the UK implementation of EN 60745-2-5:2007+A11:2009. It is derived by CENELEC from IEC 60745-2-5:2006. It supersedes BS EN 60745-2-5:2007, which is withdrawn.

The CENELEC common modifications have been implemented at the appropriate places in the text and are indicated by tags (e.g. [C] [C]).

Where a common modification has been introduced by CENELEC amendment, the tags carry the number of the amendment. For example, the common modifications introduced by CENELEC amendment A11 are indicated by [C11] [C11].

The UK participation in its preparation was entrusted to Technical Committee CPL/116, Portable motor-operated tools.

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

WARNING This standard enables the manufacture of circular saws with and without a riving knife. Therefore care should always be taken in selecting the appropriate style of saw depending on the working environment of the application.

The attention of users of this standard is drawn to sub-clause 8.12.1.101 which contains additional safety instructions to be provided with the product.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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English version

**Hand-held motor-operated electric tools -
Safety -
Part 2-5: Particular requirements for circular saws
(IEC 60745-2-5:2006, modified)**

Outils électroportatifs à moteur -
Sécurité -
Partie 2-5: Règles particulières
pour les scies circulaires
(CEI 60745-2-5:2006, modifiée)

Handgeführte motorbetriebene
Elektrowerkzeuge -
Sicherheit -
Teil 2-5: Besondere Anforderungen
für Kreissägen
(IEC 60745-2-5:2006, modifiziert)

This European Standard was approved by CENELEC on 2006-11-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
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Foreword

The text of document 61F/643/FDIS, future edition 4 of IEC 60745-2-5, prepared by SC 61F, Safety of hand-held motor-operated electric tools, of IEC TC 61, Safety of household and similar electrical appliances, was submitted to the IEC-CENELEC parallel vote.

A draft amendment, prepared by the Technical Committee CENELEC TC 61F, Safety of hand-held and transportable motor-operated electric tools, to bring the European Standard in line with the essential health and safety requirements of the Machinery Directive, was submitted to the formal vote.

The combined texts were approved by CENELEC as EN 60745-2-5 on 2006-11-01.

This European Standard supersedes EN 60745-2-5:2003.

Main changes include: Clause 19: Mechanical hazards, clarifications in respect to the guarding; editorial modifications in Annex AA, the addition of Annex M: Safety of working stands for operation with hand-held motor-operated electric tools and editorial modifications to match with EN 60745-1:2006.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2007-11-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2009-11-01

This standard is divided into two parts:

Part 1: General requirements which are common to most hand-held electric motor operated tools (for the purpose of this standard referred to simply as tools) which could come within the scope of this standard;

Part 2: Requirements for particular types of tools which either supplement or modify the requirements given in Part 1 to account for the particular hazards and characteristics of these specific tools.

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential health and safety requirements of EC Directive 98/37/EC, amended by EC Directive 98/79/EC. See Annex ZZ.

Compliance with the clauses of Part 1 together with this Part 2 provides one means of conforming with the essential health and safety requirements of the Directive concerned.

CEN/TC 255 is producing standards for non-electric circular saws (EN 792-12).

Warning: Other requirements and other EC Directives can be applicable to the products falling within the scope of this standard.

This standard follows the overall requirements of EN ISO 12100-1 and EN ISO 12100-2.

This Part 2-5 is to be used in conjunction with EN 60745-1:2006. When this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

Subclauses, tables and figures which are additional to those in Part 1 are numbered starting from 101; additional annexes are lettered AA, BB, etc.

Subclauses, tables and figures which are additional to those in IEC 60745-2-5:2006 are prefixed "Z".

Annexes ZA and ZZ have been added by CENELEC.

NOTE In this standard the following print types are used:

- requirements proper; in roman type
- *test specifications: in italic type;*
- explanatory matter: in smaller roman type.

Endorsement notice

The text of the International Standard IEC 60745-2-5:2006 was approved by CENELEC as a European Standard with agreed common modifications.

Foreword to amendment A11

This amendment to the European Standard EN 60745-2-5:2007 was prepared by the Technical Committee CENELEC TC 116 (former TC 61F), Safety of hand-held motor-operated electric tools.

It was drafted to bring the existing standard in line with the new MD (modification Subclause 6.2.7.2 and Figure Z101) and to extend Annex ZZ to include the new MD 2006/42/EC.

The text of the draft was submitted to the formal vote (as FprAB) and was approved by CENELEC as amendment A11 to EN 60745-2-5:2007 on 2009-11-17.

The following dates were fixed:

- | | |
|---|------------------|
| – latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) 2010-06-01 |
| – latest date by which the national standards conflicting with the amendment have to be withdrawn | (dow) 2010-06-01 |

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directives 98/37/EC (Machinery Directive), amended by Directive 98/79/EC, and of EC Directive 2006/42/EC. See Annexes ZZA and ZZB.

This amendment A11:2009 enables Part 2-5 to be used in conjunction with EN 60745-1:2009.

Annexes ZZA and ZZB have been added by CENELEC.

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HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – SAFETY –

Part 2-5: Particular requirements for circular saws

1 Scope

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

Addition:

This standard applies to all types of circular saws. Circular saws hereinafter will be referred to as saws. This standard does not apply to saws used with abrasive wheels.

2 Normative references

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

Addition:

EN 847-1:1997, *Tools for woodworking - Safety requirements - Part 1: Milling tools and circular saw blades* ☐

3 Terms and definitions

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

Additional definitions:

3.101

circular saw

tool intended for cutting various materials with a rotating toothed blade

3.102

cutting edge zone

the outer 20 % of the blade's radius

3.103

guide plate

the part of the saw resting on the material to be cut (see Figure 113)

3.104

lower guard

movable blade-covering device which, in the closed or rest position, is generally situated below the guide plate

3.105

upper guard

fixed and/or movable cover of the blade situated above the guide plate

3.106

riving knife

metal part placed in the plane of the saw blade with the intent of preventing the workpiece from closing on the rear part of the saw blade

3.107

saw with outer pendulum guard

saw having a lower guard which swings outside the upper guard (see Figure 101)

3.108

saw with inner pendulum guard

saw having a lower guard which swings inside the upper guard (see Figure 102)

3.109

saw with tow guard

saw having a lower guard which slides along the upper guard (see Figure 103)

3.110

kickback

sudden reaction to a pinched, bound or misaligned saw blade, causing an uncontrolled saw to lift up and out of the workpiece

3.111

plunge type saw

saw having only an upper guard into which the saw blade retracts when not in use (see Figure 104)

4 General requirements

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable.

6 Environmental requirements

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

6.1.2.4 *Modification:*

Circular saws are held and used as specified in 6.1.2.5.

6.1.2.5 *Modification:*

Circular saws are tested under load observing the conditions shown in Table Z101. 

Table Z101 – Operating conditions for circular saws

Orientation	Cutting a horizontal piece of chipboard with minimum dimensions 800 mm x 600 mm and a thickness depending on maximum cutting depth of the circular saw maximum cutting depth ≤ 40 mm: chipboard thickness 19 mm maximum cutting depth > 40 mm: chipboard thickness 38 mm The board shall be firmly fixed by screws or clamps to a test bench using resilient material. It shall be mounted so that it does not have any significant resonance in the frequency range that can influence the test result. The board excess end shall be 250 mm from the clamped area and shall be readjusted at the beginning of each series of tests.
Tool bit	New blade as recommended by the manufacturer for cutting chipboard
Feed force	Just sufficient to cut at a brisk pace. Equal force shall be applied to both handles, if applicable. Excessive grip forces shall be avoided.
Test cycle	One test cycle is given by cutting off one approximately 10 mm wide strip (set by rip fence if available) across the 600 mm width of the chipboard. The measurement starts when the blade enters the wood and finishes when the blade leaves the wood.

6.2 Vibration

6.2.4.2 Location of measurement

Addition:

Figure Z101 shows the positions on the main handle and the auxiliary handle, if applicable.

6.2.6.3 Operating conditions

Addition:

Circular saws are tested under load observing the conditions shown in Table Z101. 

6.2.7.2 Declaration of the vibration total value

Addition:

The vibration total value a_h of the handle with the highest emission and the uncertainty K shall be declared. 

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:

Saws shall be marked with:

- direction of rotation, indicated on the tool by an arrow, raised or recessed or by any other means no less visible and indelible;
- rated no-load speed of the output spindle;
- recommended blade diameter.

8.12.2 a) Addition:

101) Instructions not to use any abrasive wheels

102) For saws with riving knife the instruction shall include the following:

Instructions to ensure that the riving knife is adjusted so that the distance between the riving knife and the rim of the blade is not more than 5 mm, and the rim of the blade does not extend more than 5 mm beyond the lowest edge of the riving knife.

☐ Z101) Instruction on the correct use of the dust collection system

Z102) Instruction to wear a dust mask

Z103) Instruction to only use saw blades recommended

Z104) Instruction to always wear hearing protection ☐

8.12.2 b) Addition

101) Instructions for the blade changing procedure

☐ Z101) Maximum cutting depth ☐

Additional subclause:

8.12.1.101 The following additional safety instructions shall be given. If in English they shall be verbatim and in the following order as applicable and equivalent in any other language. This part may be printed separately from the general safety instructions.

All notes are not to be printed, they are information for the designer of the manual.

8.12.1.101.1 Safety instructions for all saws

- a)  **DANGER: Keep hands away from cutting area and the blade. Keep your second hand on auxiliary handle, or motor housing. If both hands are holding the saw, they cannot be cut by the blade.**

NOTE For circular saws with 140 mm or smaller diameter blades, the "Keep your second hand on auxiliary handle, or motor housing" may be omitted.

- b) **Do not reach underneath the workpiece. The guard cannot protect you from the blade below the workpiece.**
- c) **Adjust the cutting depth to the thickness of the workpiece. Less than a full tooth of the blade teeth should be visible below the workpiece.**

- d) **Never hold piece being cut in your hands or across your leg. Secure the workpiece to a stable platform.** *It is important to support the work properly to minimize body exposure, blade binding, or loss of control.*
- e) **Hold power tool by insulated gripping surfaces when performing an operation where the cutting tool may contact hidden wiring or its own cord.** *Contact with a "live" wire will also make exposed metal parts of the power tool "live" and shock the operator.*
- f) **When ripping always use a rip fence or straight edge guide.** *This improves the accuracy of cut and reduces the chance of blade binding.*
- g) **Always use blades with correct size and shape (diamond versus round) of arbour holes.** *Blades that do not match the mounting hardware of the saw will run eccentrically, causing loss of control.*
- h) **Never use damaged or incorrect blade washers or bolt.** *The blade washers and bolt were specially designed for your saw, for optimum performance and safety of operation.*

8.12.1.101.2 Further safety instructions for all saws

Causes and operator prevention of kickback:

- kickback is a sudden reaction to a pinched, bound or misaligned saw blade, causing an uncontrolled saw to lift up and out of the workpiece toward the operator;
- when the blade is pinched or bound tightly by the kerf closing down, the blade stalls and the motor reaction drives the unit rapidly back toward the operator;
- if the blade becomes twisted or misaligned in the cut, the teeth at the back edge of the blade can dig into the top surface of the wood causing the blade to climb out of the kerf and jump back toward 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) **Maintain a firm grip with both hands on the saw and position your arms to resist kickback forces. Position your body to either side of the blade, but not in line with the blade.** *Kickback could cause the saw to jump backwards, but kickback forces can be controlled by the operator, if proper precautions are taken.*

NOTE For circular saws with 140 mm or smaller diameter blades, the words "with both hands" may be omitted.

- b) **When blade is binding, or when interrupting a cut for any reason, release the trigger and hold the saw motionless in the material until the blade comes to a complete stop. Never attempt to remove the saw from the work or pull the saw backward while the blade is in motion or kickback may occur.** *Investigate and take corrective actions to eliminate the cause of blade binding.*
- c) **When restarting a saw in the workpiece, centre the saw blade in the kerf and check that saw teeth are not engaged into the material.** *If saw blade is binding, it may walk up or kickback from the workpiece as the saw is restarted.*
- d) **Support large panels to minimise the risk of blade pinching and kickback.** *Large panels tend to sag under their own weight. Supports must be placed under the panel on both sides, near the line of cut and near the edge of the panel.*
- e) **Do not use dull or damaged blades.** *Unsharpened or improperly set blades produce narrow kerf causing excessive friction, blade binding and kickback.*
- f) **Blade depth and bevel adjusting locking levers must be tight and secure before making cut.** *If blade adjustment shifts while cutting, it may cause binding and kickback.*
- g) **Use extra caution when making a "plunge cut" into existing walls or other blind areas.** *The protruding blade may cut objects that can cause kickback.*

8.12.1.101.3 Safety instructions for saws shown in Figures 101, 102 and 103

- a) **Check lower guard for proper closing before each use. Do not operate the saw if lower guard does not move freely and close instantly. Never clamp or tie the lower guard into the open position.** *If saw is accidentally dropped, lower guard may be bent. Raise the lower guard with the retracting handle and make sure it moves freely and does not touch the blade or any other part, in all angles and depths of cut.*

NOTE Alternate wording may be substituted for "retracting handle."

- b) **Check the operation of the lower guard spring. If the guard and the spring are not operating properly, they must be serviced before use.** *Lower guard may operate sluggishly due to damaged parts, gummy deposits, or a build-up of debris.*
- c) **Lower guard may be retracted manually only for special cuts such as "plunge cuts" and "compound cuts." Raise lower guard by retracting handle and as soon as blade enters the material, the lower guard must be released.** *For all other sawing, the lower guard should operate automatically.*

NOTE Alternate wording may be substituted for "retracting handle."

- d) **Always observe that the lower guard is covering the blade before placing saw down on bench or floor.** *An unprotected, coasting blade will cause the saw to walk backwards, cutting whatever is in its path. Be aware of the time it takes for the blade to stop after switch is released.*

8.12.1.101.4 Safety instructions for saws shown in Figure 104

- a) **Check guard for proper closing before each use. Do not operate the saw if guard does not move freely and enclose the blade instantly. Never clamp or tie the guard with the blade exposed.** *If saw is accidentally dropped, guard may be bent. Check to make sure that guard moves freely and does not touch the blade or any other part, in all angles and depths of cut.*
- b) **Check the operation and condition of the guard return spring. If the guard and the spring are not operating properly, they must be serviced before use.** *Guard may operate sluggishly due to damaged parts, gummy deposits, or a build-up of debris.*
- c) **Assure that the guide plate of the saw will not shift while performing the "plunge cut" when the blade bevel setting is not at 90°.** *Blade shifting sideways will cause binding and likely kick back.*
- d) **Always observe that the guard is covering the blade before placing saw down on bench or floor.** *An unprotected, coasting blade will cause the saw to walk backwards, cutting whatever is in its path. Be aware of the time it takes for the blade to stop after switch is released.*

8.12.1.101.5 Additional safety instructions for all saws with riving knife

- a) **Use the appropriate riving knife for the blade being used.** *For the riving knife to work, it must be thicker than the body of the blade but thinner than the tooth set of the blade.*
- b) **Adjust the riving knife as described in this instruction manual.** *Incorrect spacing, positioning and alignment can make the riving knife ineffective in preventing kickback.*
- c) **Always use the riving knife except when plunge cutting.** *Riving knife must be replaced after plunge cutting. Riving knife causes interference during plunge cutting and can create kickback.*
- d) **For the riving knife to work, it must be engaged in the workpiece.** *The riving knife is ineffective in preventing kickback during short cuts.*
- e) **Do not operate the saw if riving knife is bent.** *Even a light interference can slow the closing rate of a guard.*

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 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.

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 Replacement:

Saws shall be so guarded as to minimise the risk of accidental access to the rotating blade as far as conditions of use will permit. Guarding systems shall not be removable without the aid of a tool.

There are four commonly used guarding systems for saws, as shown in Figures 101, 102, 103 and 104. Guarding systems can be designed with the blade on the right or on the left side of the saw. These guarding systems shall comply with the requirements of 19.101 and 19.102.

Each one of these guarding system types can be designed with or without the riving knife (item 6 in the figures).

- If a guarding system is designed with a riving knife, it shall meet the additional requirements of Annex AA.
- If a guarding system is designed without a riving knife, it shall meet the additional requirements of Annex BB.

Other means of achieving the necessary degree of mechanical safety are allowed, provided that these are as equally effective and reliable as those specified.

Compliance is checked by inspection.

19.3 This subclause is not applicable.

Additional subclauses:

19.101 Guarding above the guide plate

19.101.1 The blade above the guide plate shall be guarded by the upper guard.

19.101.2 Apertures in the guarding system above the guide plate, unless otherwise specified below, shall be designed such that the test probe 'a' of Figure 105, when inserted at any angle and to the depth allowed by its stop, shall not be able to contact the cutting edge zone of any recommended blade.

19.101.2.1 On the motor side of the upper guard, adjacent to the cutting edge zone at the front of the blade, an aperture may be provided for viewing the line of the cut. This viewing aperture shall either meet the requirements of 19.101.2, as illustrated in Figure 106, or it shall be limited by proximity and height restrictions.

- Proximity restriction

The straight line distance from a defined measuring point on the auxiliary handle surface to the cutting edge zone of any recommended blade shall be a minimum of 120 mm as shown in Figure 107. If there is no auxiliary handle provided, the distance shall be measured from the motor casing. If the motor casing is not suitable for grasping, the measurement is made from the geometric centre of the switch trigger grasping surface with the switch in the off position.

Compliance is checked by the following measurements, which shall be conducted with the guide plate set to any depth of cut and 90°.

To establish the measuring point on the auxiliary handle or the motor casing, follow the procedure outlined below. The guide plate is set to maximum depth of cut and 90°.

- a) Establish the closest (A) and the most distant (B) points on the auxiliary handle or motor casing defined grasping surface from the blade. For the motor casing, the closest (A) point to the blade is assumed to be in the plane of the main handle farthest from the blade. Equidistant between points (A) and (B), but not more than 45 mm away from point (A), draw the vertical intersecting line of the plane parallel with the blade and the surface of the auxiliary handle or motor casing, as applicable.
- b) Establish the closest (C) and the most distant (D) point from the plane of the guide plate on the auxiliary handle or motor casing defined grasping surface. Equidistant between points (C) and (D), draw the horizontal intersecting line of the plane parallel with the guide plate and the surface of the auxiliary handle or motor casing, as applicable.
- c) The intersection of the vertical and horizontal lines drawn on the applicable surface is the defined measuring point.

- Height restriction

The height of the viewing aperture (H) measured from the bottom plane of the guide plate, as shown in Figure 108a, is limited to the point where the line of sight, from the ordinary operator's head position to the tip of the saw blade cutting the wood, is intersecting the outer surface of the upper guard.

The maximum permissible height H , in millimetres, is given by the formula

$$H = \frac{848 U}{205 + S}$$

where

U is the maximum distance, in millimetres, from the cutting edge zone to the outer surface of the upper guard at the top end of the viewing aperture, measured perpendicularly to the plane of the saw blade (see Figure 108b);

S is the distance, in millimetres, from the plane of the saw blade to a parallel centreplane of the switch handle (see Figure 108c).

Compliance is checked by measurement, which shall be conducted with the guide plate set to maximum depth of cut and 90°.

19.101.2.2 The upper guard on the side opposite the motor need not completely cover the blade. The perpendicular projection of the upper guard on to the blade shall cover at least the smallest recommended blade-cutting edge zone. The space between the upper guard and the blade shall be designed such that the test probe 'a' of Figure 105 when inserted at any angle and to the depth allowed by its stop, shall not be able to contact the saw blade teeth tips of the recommended blade, as illustrated in Figure 106.

19.101.2.3 For saws having an inclinable guide plate, the distance X between the guide plate and the edge of the lateral side of the upper guard on the side opposite to the motor and adjacent to the front cutting edge zone of the blade, as shown in Figure 109, shall not exceed:

- a) 38 mm for circular saws with a blade diameter less than 265 mm;
- b) 45 mm for circular saws with blade diameter equal or greater than 265 mm;
- c) 55 mm for circular saws with blade diameter equal or greater than 265 mm and where the lower guard is not provided with any retracting handle and the only means for operating the lower guard is remotely from the motor side of the upper guard.

Compliance is checked by measurement of the distance X along the lines perpendicular to the plane of the guide plate, as shown in Figure 109.

For all saws where the depth of the cut setting is achieved by pivoting the guide plate front of the blade, the measurements shall be conducted with the guide plate set for the 90° setting and to maximum depth of cut.

For saws where the depth of the cut setting is achieved by pivoting the guide plate at the rear of the blade or where the guide plate at minimum and maximum depth are parallel, the measurements shall be conducted with the guide plate set for the 90° setting and to any depth of cut.