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Safety of hand-held motor-operated electric tools - Part 2-5: Particular requirements for circular saws

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Titre :

Title : IEC 60745-2-5-A1 Ed 3.0: Safety of hand-held motor-operated electric tools - Part 2-5: Particular requirements for circular saws.

Note d'introduction

Introductory note

ATTENTION	ATTENTION
CDV soumis en parallèle au vote (CEI) et à l'enquête (CENELEC)	**Parallel IEC CDV/CENELEC Enquiry**

***Add,** after Annex L, the following new Annex M:*

Annex M
(normative)

Safety of working stands for operation with hand-held motor operated electric tools

M.1 Scope

This clause of Part 2 is applicable, except as follows:

M.1.1 *Addition:*

This standard applies to saw tables intended to be equipped with hand-held motor operated circular saws with a maximum saw blade diameter of 260 mm intended for cutting wood and similar materials.

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

M.2 Normative references

This clause of Part 1 is applicable.

M.3 Definitions

M.3.101
saw table
working stand with which a hand-held circular saw can be used similar to a circular saw bench in a stationary position (see Figure M.1)

M.3.102
blade guard
protection mounted above the saw table which prevents access to the saw blade

M.3.103
electrical system
mains connection and associated control systems

M.8 Marking and instructions

This clause of Part 1 is applicable except as follows:

M.8.1 *Replacement:*

Saw tables shall be marked with:

– rotation direction of the saw blade

– maximum cutting depth or maximum saw blade diameter

– rated voltage and maximum rated input or current

NOTE Saw tables with electrical systems require voltage and input or current ratings.

Compliance is checked by inspection.

M.8.12.1 *Addition:*

The operating instruction shall contain warning statements on the following subjects:

– Not to use hand to remove loose splinters, chips and similar parts of the workpiece from the vicinity of the moving saw blade;
– Not to use the saw table outdoor when raining;
– Not to perform any sawing operation “Freehand”, i.e. guiding the workpiece only with hand, without rip fence or miter gauge.

Compliance is checked by inspection.

M.8.12.2 *Addition:*

The operating instruction shall contain the substance of the following, if applicable:

– Information how to fit the hand-held saw to the saw table;
– Information how to replace the riving knife of the hand-held saw by the blade guard support with riving knife function and its adjustment;
– Instruction to store the push stick or push block always with the saw table when not in use;
– Proper use of the blade guard;
– Information explaining the phenomenon of kickback and instructions for cutting procedures to avoid the kickback;
– Proper use and adjustment for the riving knife;
– Recommended operator’s body and hand positions during the operation;
– Recommended procedures for securing the saw to the saw table;
– Procedures for cross-cutting and ripping. Proper use of cross-cut fence (miter gauge) and the rip fence;
– Alignment of the blade with the rip fence and with the cross-cut fence (miter gauge) slots;
– Recommended procedures for depth of cut and bevel angle adjustments;
– Recommendation on how to support the workpiece on the outfeed side and on the side of the table surface;
– Recommended procedures for slotting and rabbeting;
– Proper use and basic construction guidelines for work helpers, such as push stick, push block, auxiliary fence and featherboard;
– Procedure for changing and adjusting the table insert;
– Inappropriate applications of saw table, i.e. not to use the saw table for cutting firewood logs;
– Selection of the saw blade depending on the material to be cut.
– Inspection for a deformed or damaged saw blade;
– Connecting the circular saw to a dust collecting device when sawing.

M.19 Mechanical hazards

This clause of Part 1 is applicable except as follows:

Additional subclauses:

M.19.1 *Addition:*

The saw table shall be equipped with an adequate guarding system which shall comply with the requirements of M.19.1.101 to M.19.1.102.

M.19.1.101 Guarding below the table top

If the design of the saw table is such that the guide plate of the circular saw is not in contact with the table plate, the cutting edge zone of the saw blade between the guide plate and the table plate shall be guarded by a fixed guard in any position.

Compliance is checked by inspection and by the following test.

The test probe "a" shown in Figure 105 in minimum and maximum depth of cut and any inclination of the saw blade to check accessibility of the saw blade teeth of all saws recommended by the manufacturer in the area between guide plate and table plate.

M.19.1.102 Guarding above the table top

M.19.1.102.1 Blade guard

A blade guard shall be provided to guard that portion of the saw blade above the table top which is not required for cutting.

Circular saw tables shall have a blade guard for the crown and the front of the saw blade that may be an adjustable guard, a self-closing guard or a combination of these. An adjustable guard when adjusted shall remain in any position necessary to give the required protection.

M.19.1.102.1.1 The blade guard shall be designed to prevent contact with the periphery and/or both sides of the toothed rim of the saw blade, the riving knife being considered as a safety measure against touching the rising part of the toothed rim. This protection shall be given at any tilted position of the saw blade. The blade guard shall be capable of being lowered or turned down onto the table surface in front of the saw blade.

Compliance is checked by inspection.

M.19.1.102.1.2 The blade guard shall be made of material (e.g. plastic, aluminium) which is easy to cut by saw blades. On non-transparent blade guards, the line of the cut shall be indicated.

Compliance is checked by inspection.

M.19.1.102.1.3 The blade guard shall be fitted with an exhaust outlet.

Compliance is checked by inspection and the following test.

It shall not be possible to touch dangerous moving parts with the test probe "a" of Figure 105 through dust collection openings after the removal of the removable provisions. During the test, the adjustable guard shall be against the table top and the circular saw with the highest intended cutting depth shall be mounted.

M.19.1.102.1.4 The blade guard side walls shall either have a minimum thickness of 6 mm or shall have internal ribs with a minimum thickness of 3 mm designed to bear against the body of the saw blade in order to minimize the risk of damage to the blade guard.

Compliance is checked by inspection.

M.19.1.102.1.5 The blade guard shall be so designed that it raises when leading in the workpiece to be cut which has a thickness of 20 mm above the adjusted height of the blade guard.

Compliance is checked by inspection and by manual test.

M.19.1.102.2 Blade guard support

M.19.1.102.2.1 The blade guard shall be held by a blade guard support which is placed either

– in the cutting line and has the function of a riving knife at the same time, or

– outside the cutting line.

Replacing of the riving knife by a guard support, which has the function of a riving knife at the same time, is permitted only when this is specified by the manufacturer of the circular saw.

Compliance is checked by inspection.

M.19.1.102.2.2 A blade guard support placed outside the cutting slot shall be arranged such that it is possible to saw with the maximum cutting width which can be set by the rip fence without being impeded by the blade guard support.

Compliance is checked by inspection.

M.19.1.102.2.3 The blade guard support shall have sufficient stability.

Compliance is checked by the following test, carried out without a saw blade fitted.

The following applies (see Figure M.2):

– *Position „X" is the part of the guard nearest to the operator on the infeed side.*

– *Position „Y" is the part of the guard which is in line with the very first tooth of the saw blade intended for maximum cutting depth.*

The blade guard shall be subjected to a load of 20 N at the front edge of the blade guard (position "X"), first in the direction „A" and then in direction „B". The distance between both deflections, measured at point „Y", shall not be more than 30 mm.

M.19.1.103 Riving knife

M.19.1.103.1 Saw tables which are ready for operation shall be equipped with a riving knife. This requirement is met when a hand-held circular saw with its own riving knife is installed.

For mounting a circular saw without riving knife, a riving knife shall be separately installed which allows adjustment at each cutting depth.

The riving knife shall be rigidly fixed within the cutting depth and be in alignment with the plane of the blade and disposed to it so as to pass freely through the cutting groove; it shall not contact the blade. The position of the riving knife shall not change as a result of operation.

Compliance is checked by inspection and by the following test.

The riving knife is adjusted to the maximum distance specified in AA.19.102. The fastening screws of the riving knife are tightened with a torque specified by the manufacturer. At the centre of the riving knife tip, a force of 100 N is applied for 1 min in the cutting direction and parallel to the guide plate, as shown in Figure AA.101.

During the test, the riving knife shall not touch the blade's cutting edge zone. After this test, the tip of the riving knife shall not have been displaced by more than 3 mm in direction of the force.

19.1.103.2 The riving knife and its holder shall be so designed as to allow the adjustment of the riving knife, for all blade diameters resulting in cutting depths between 100 % and 90 % of the rated cutting depth, to comply with the following conditions of Figure AA.102:

a) above the table, the radial distance between the riving knife and the edge of the blade shall not at any point exceed 5 mm at the depth of cut set;

b) the distance from the tip of the riving knife to the rim of the blade shall not exceed 5 mm, when measured along the line perpendicular to the table top.

Compliance is checked by inspection and by measurement.

19.1.103.3 The riving knife shall not be thicker than the width of the groove cut by the saw blade and not thinner than the body of the blade.

For saws with a rated cutting depth exceeding 55 mm, the riving knife and its holder shall be so designed that when the cutting depth is adjusted, the riving knife automatically continues to comply with the requirements of 19.1.103.2.

Compliance is checked by inspection.

19.1.103.4 The riving knife shall be made of steel with a hardness of between 35 HRC and 48 HRC and a resistance to rupture at least equal to 800 MPa.

Its tip shall be rounded, with a radius of not less than 2 mm, and its edges shall not be sharp. The width of the riving knife, measured at the guide plate level for the maximum cutting depth of the saw, shall be at least equal to 1/8 of the diameter of the maximum diameter of the circular saw blade as described by the manufacturer's instructions. Moreover, the faces of the riving knife shall be plane, smooth and parallel and shall be slightly chamfered on the edge facing the blade.

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

The guide plate is set to maximum depth of cut at 90°. The riving knife is adjusted for the maximum recommended saw blade in accordance with AA.19.102. The fastening screws of the riving knife are tightened with the torque specified by the manufacturer.

At the centre of the riving knife tip, a force W as specified in Table M.1 is applied for 1 min in both directions perpendicular to the blade, as shown in Figure AA.101.

After this test, the tip of the riving knife shall not have been displaced in the direction of the force by more than half the thickness of the riving knife.

Table M.1 - Riving knife testing - strength of riving knife

Diameter of saw blade mm	Load applied to riving knife N
D ≤ 60	10
60 < D ≤ 100	15
100 < D ≤ 200	20
200 < D ≤ 250	25
D > 250	30

M.19.1.104 Table top

M.19.1.104.1 Saw tables shall comply with the dimensions given in Figure M.3 depending on the saw blade diameters.

Compliance is checked by inspection and by measurement.

M.19.1.104.2 The width of the slot in the table shall not exceed 12 mm.

If it is necessary to alter the width of the slot because of using different saw blades or for tilted cuts it may be carried out by using interchangeable table inserts.

The table slot shall be lined with a material which is easily cut by the saw blade (e.g. wood, plastic, aluminium) for a width of at least 3 mm.

Table inserts shall be fixed such that they cannot be thrown out by the rising part of the saw blade.

Compliance is checked by inspection and by measurement.

M.19.1.104.3 When the table is intended to be used for bevel cutting, the adjustment shall be performed by tilting the saw blade and not by tilting the table.

Compliance is checked by inspection.

M.19.1.105 Workpiece guiding

M.19.1.105.1 Rip fence

Saw tables for hand-held circular saws shall be provided with a rip fence or with a cross-cut fence which can also be used as a rip fence (see Figure M.1).

The guiding side of the rip fence shall be made of a material which is easily cut by the saw blade (e.g. wood, plastic, aluminium), unless the adjustment of the fence is limited in a way that the rip fence and the saw blade cannot come into contact.

A rip fence shall at least extend from the front of the table to the centre of the saw blade.

If the rip fence is adjustable, parallel to the saw blade, it shall be possible to fasten it in such a position parallel to the saw blade that its outfeed end is located between the points A and B of Figure M.4.

The minimum height of the rip fence in contact with the workpiece shall be half of the maximum depth of cut or 50 mm, whichever is smaller. For small cutting depths, the height of the rip fence in contact with the workpiece shall be between 6 mm and 15 mm. A rip fence shall be either a single part with either side of the rip fence of different heights which can be mounted in two positions, or two parts with sides of different height mounted alternatively.

If the saw blade can be tilted towards a rip fence with two different heights, it shall not touch point B of the rip fence (see Figure M.5).

The guiding sides and the upper surface of the rip fence shall be even and without spacings. Holes up to 10 mm are disregarded.

Compliance is checked by inspection and by measurement.

M.19.1.105.2 Cross-cut fence

Saw tables which also can be used as a pull saw shall be provided with a cross-cut fence or an angular fence which can be used as a cross-cut fence (see Figure M.1).

The fixing arrangement shall ensure that the fence cannot rise or swing out of position, as illustrated in Figure M.6.

The minimum height of the guiding surface of the fence shall be 30 mm or the maximum depth of cut, whichever is the smaller.

If the cross-cut fence reaches under the guard this part of the cross-cut fence shall have a maximum height of 15 mm.

A rigid cross-cut fence shall dimensioned such that the distance “e” between the cross-cut fence and the saw blade as given in Figure M.3 is not exceeded.

If the cross-cut fence is adjustable, it shall be possible to fasten it in such a position that the distance between cross-cut fence and saw blade does not exceed the dimension “e” as given in Figure M.3.

If contact between the cross-cutting fence and the saw blade cannot be avoided, the part close to the saw blade shall be made of a material which will not disintegrate or cause the saw blade to disintegrate should the fence come into contact with the moving saw blade e.g. aluminium, wood or plastic.

Compliance is checked by inspection and by measurement.

M.19.1.106 Push stick

A push stick or push block handle shall be provided. The surface that may contact the saw blade shall be constructed from shatterproof materials capable of withstanding the pressure necessary to feed the workpiece. The material shall be such so as to not give rise to danger in the event of contact between the saw blade and the push stick, e.g. wood or plastic.

The minimum length of push sticks shall be 400 mm or the length of the table, whichever is the less (see Figure M.1 and Figure M.7).

M.19.4 *Replacement:*

Saw tables shall stand safely on the ground/base .

Compliance is checked by the following test.

The saw table is fitted with the hand-held circular saw specified by the manufacturer which is likely to give the most unfavourable results for the purpose of this requirement. In accordance with the instructions of the manufacturer, the saw table is set up or mounted on a three layer chip board according to ISO 820.

A horizontal force, pushing against the front edge of the table top surface, is applied. A force of 300 N shall not cause the saw table to tip over, and a force of 100 N shall not cause the table to move.

M.20 Mechanical strength

This clause of Part 1 is applicable except as follows:

Additional subclauses:

M.20.1.101 The saw table shall have adequate strength.

Compliance is checked by loading the table with a mass of 15 kg. The load is applied in table centre distributed equally on a rectangular area with the dimensions of 0,5 x table length times 0,5 x table width.

After removing the mass the saw table shall not show any permanent deformation.