



International Standard

ISO 19085-9

Woodworking machines — Safety — Part 9: Circular saw benches (with and without sliding table)

Machines à bois — Sécurité —

Partie 9: Scies circulaires à table de menuisier (avec et sans table mobile)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 39, *Machine tools*, Subcommittee SC 4, *Woodworking machines*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 142, *Woodworking machines - Safety*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 19085-9:2019), which has been technically revised. The main changes are as follows:

- the Scope now specifies that machines are capable of continuous production use;
- displaceable machines are not referenced anymore;
- the list of significant hazards has been moved to new [Annex A](#);
- the structure has been simplified and modified, in particular for [5.6](#);
- [subclause 6.2](#) has been updated;
- a new full noise test code has been added in [Annex F](#).

A list of all parts in the ISO 19085 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The ISO 19085 series provides technical safety requirements for the design and construction of woodworking machinery, as well as for the content of the relevant instruction handbook. It concerns designers, manufacturers, suppliers and importers of the machines specified in the Scope.

This document is a type-C standard as defined in ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (e.g. regulators, accident prevention organisations, market surveillance)

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate in the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards (as defined in ISO 12100:2010), the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

The full set of requirements for a particular type of woodworking machine are those given in the part of the ISO 19085 series applicable to that type, together with the relevant requirements from ISO 19085-1:2021, to the extent specified in the Scope of the applicable part of the ISO 19085 series.

As far as possible, the safety requirements of parts of the ISO 19085 series refer to the relevant clauses of ISO 19085-1:2021. Each part includes replacements and additions to the common requirements given in ISO 19085-1:2021.

All parts of the ISO 19085 series have the same structure, so that reference to ISO 19085-1:2021 is made always and only from and to the same subclause number.

[Clauses 1](#) to [3](#) are specific to each part and, therefore are distinct from ISO 19085-1:2021, Clauses 1 to 3.

For [Clauses 4](#) to [7](#) and the annexes, each subclause in ISO 19085-1:2021, is cited as:

- confirmed as a whole;
- confirmed with additions;
- excluded in total; or
- replaced with specific text.

This is indicated by one of the following possible statements:

- “ISO 19085-1:2021, [subclause/Annex], applies.”;

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- “ISO 19085-1:2021, [subclause/Annex], applies with the following additions.” or “ISO 19085-1:2021, [subclause/Annex], applies with the following additions, subdivided into further specific subclauses.”;
- “ISO 19085-1:2021, [subclause/Annex], does not apply.”;
- “ISO 19085-1:2021, [subclause/Annex], is replaced by the following text.” or “ISO 19085-1:2021, [subclause/Annex], is replaced by the following text, subdivided into further specific subclauses.”.

Other subclauses and annexes specific to this document are indicated by the introductory sentence: “Subclause/Annex specific to this document.”.

Woodworking machines — Safety —

Part 9: Circular saw benches (with and without sliding table)

1 Scope

This document specifies the safety requirements and measures for circular saw benches with or without sliding table or demountable power feed unit or both and capable of continuous production use, also known as “table saws” (in the USA), hereinafter referred to also as “machines”.

The machines are designed to cut solid wood and material with similar physical characteristics to wood (see ISO 19085-1:2021, 3.2).

This document deals with all significant hazards, hazardous situations and events as listed in [Annex A](#) relevant to the machines when operated, adjusted and maintained as intended and under the conditions foreseen by the manufacturer; reasonably foreseeable misuse has been considered too. Transport, assembly, dismantling, disabling and scrapping phases have also been taken into account.

This document is also applicable to machines fitted with one or more of the following devices or working units, whose hazards have been dealt with:

- device for the main saw blade and scoring saw blade to be raised and lowered through the table;
- device to tilt the main saw blade and scoring saw blade for angled cutting;
- device for scoring;
- device for grooving with milling tool with a width not exceeding 20 mm in one pass;
- demountable power feed unit;
- additional manually operated sliding table;
- powered workpiece clamping device.

This document does not apply to:

- a) machines intended for outdoor use on building sites;

NOTE Building site saws (contractor saws) are covered by the requirements of ISO 19085-10:2018.
- b) handheld woodworking machines including any adaptation permitting their use in a different mode, i.e. bench mounting;
- c) machines intended for use in a potentially explosive atmosphere;
- d) machines manufactured prior to the publication of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 19085-1:2021, *Woodworking machines — Safety — Part 1: Common requirements*

EN 847-1:2017, *Tools for woodworking — Safety requirements — Part 1: Milling tools, circular saw blades*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010, ISO 19085-1:2021 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

circular saw bench table saw

hand-fed machine fitted with a single main circular saw blade which is fixed in position during the cutting operation and a horizontal table fixed during operation all around the saw blade

Note 1 to entry: The main parts and their terminology are shown in [Figure 1](#).

Note 2 to entry: The main saw blade is mounted on a spindle below the table.

Note 3 to entry: Circular saw benches are mainly used for ripping, cross cutting, dimensioning and grooving.

3.2

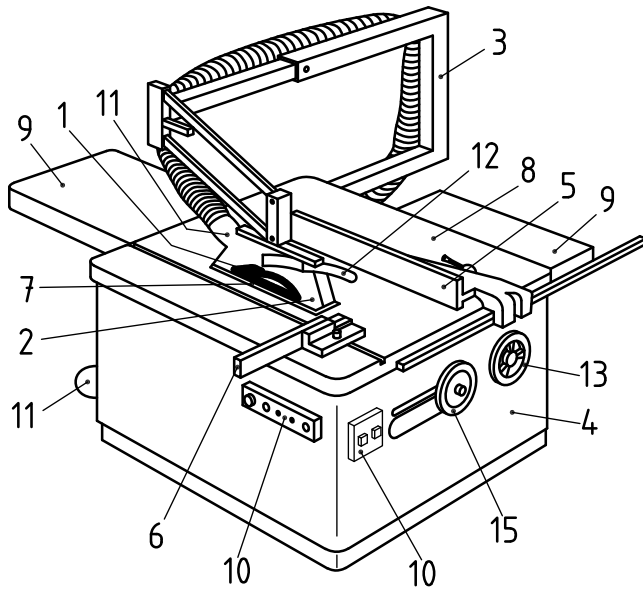
grooving

making of a cut in the surface of the workpiece not deep enough to pass through, using the saw blade or a milling tool

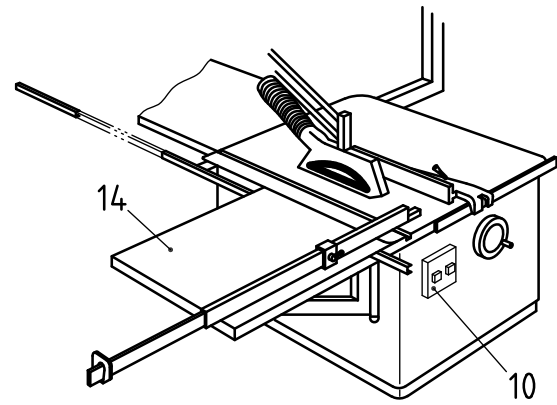
3.3

initiation control

control which, after actuation, enables the provision of power to specific machine actuators, for example, by a programmable logic control



a) Saw bench



b) Saw bench with sliding table

Key

1	ripping knife	9	extension table
2	saw blade guard	10	controls
3	saw blade guard support	11	chips and dust outlet
4	fixed guard beneath table	12	push stick in holding position
5	rip fence	13	cutting height adjustment
6	cross-cut fence	14	sliding table
7	table insert	15	inclination adjustment
8	machine table		

Figure 1 — Examples of a circular saw bench

4 Safety requirements and measures for controls

4.1 Safety and reliability of control systems

ISO 19085-1:2021, 4.1 applies with the following additions.

[Table B.1](#) summarizes the performance levels required (PL_r) in [Clauses 4](#) and [5](#) for each safety function.

4.2 Control devices

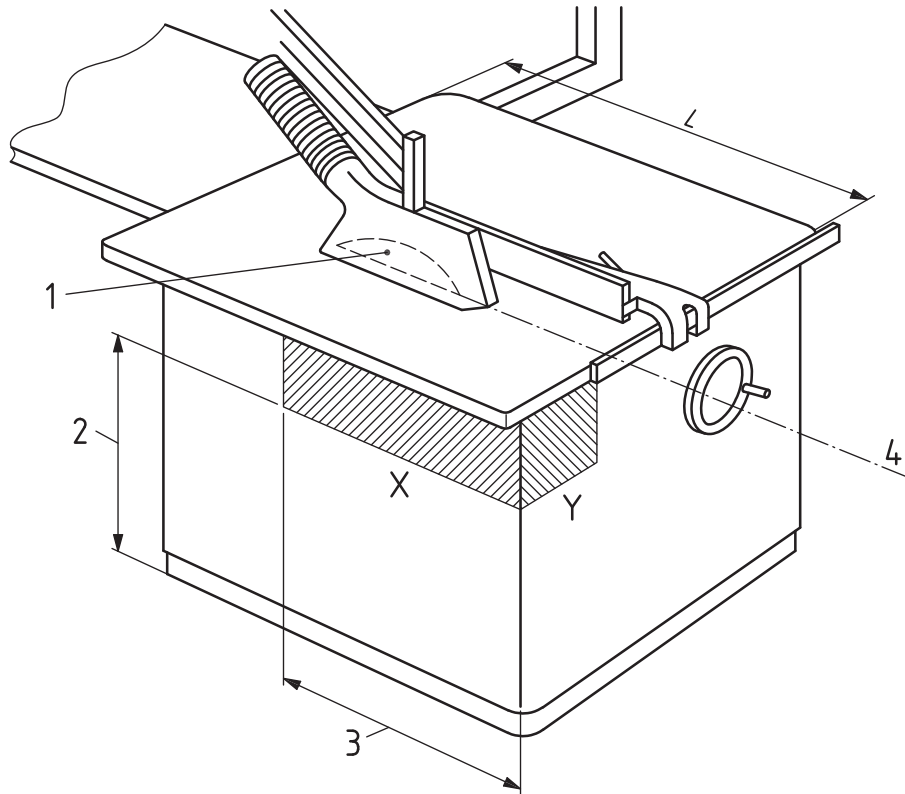
ISO 19085-1:2021, 4.2 applies with the following additions.

The electrical control devices except the main switch shall be located:

- a) for machines designed to be used without a sliding table, either
 - 1) in the shaded area marked X or in the shaded area marked Y in [Figure 2](#), or
 - 2) on a movable control panel;
- b) for machines equipped with a sliding table or where provision is made for the use of a sliding table, either
 - 1) in the shaded area marked Y in [Figure 2](#), or

2) on a movable control panel.

A normal stop control device shall be located adjacent to each start control device.



Key

X	left side controls area	3	$\leq \frac{1}{2} L$
Y	front side controls area (on the left of cutting line)	4	cutting line
1	saw blade	L	length of machine table
2	≥ 600 mm		

Figure 2 — Position of control devices

The shaded areas X and Y are located below the table at a distance of at least 50 mm from the table top and more than 600 mm above the floor (see [Figure 2](#) Key 1), and:

- on the left side of the machine (area X) and extending not more than half of the table length, L (see [Figure 2](#) Key 2);
- on the front side of the machine (area Y) on the left of the cutting line.

The movable control panel fixed to the machine shall be located so that:

- its front face is at a distance from the front edge of the table not exceeding 700 mm;
- its upper edge is at a distance from the floor level not exceeding 1 800 mm.

4.3 Start

4.3.1 Direct start

ISO 19085-1:2021, 4.3.1 applies with the following additions.

The scoring saw blade drive shall not be capable of being started before the main saw blade drive.

The safety related parts of the control system (SRP/CS) for interlocking between the scoring saw blade drive and the main saw blade drive shall achieve $PL_r = c$.

4.3.2 Start via control power-on

ISO 19085-1:2021, 4.3.2 does not apply.

4.4 Safe stops

4.4.1 General

ISO 19085-1:2021, 4.4.1 applies.

4.4.2 Normal stop

ISO 19085-1:2021, 4.4.2 applies.

4.4.3 Operational stop

ISO 19085-1:2021, 4.4.3 does not apply.

4.4.4 Emergency stop

ISO 19085-1:2021, 4.4.4 applies.

4.5 Braking function of tools

ISO 19085-1:2021, 4.5 applies.

4.6 Mode selection

ISO 19085-1:2021, 4.6 does not apply.

4.7 Tool speed changing

4.7.1 Speed changing by shifting the belts on the pulleys

ISO 19085-1:2021, 4.7.1 applies.

4.7.2 Speed changing by incremental speed change motor

ISO 19085-1:2021, 4.7.2 applies.

4.7.3 Infinitely variable speed by frequency inverter

ISO 19085-1:2021, 4.7.3 applies.

4.8 Failure of any power supply

ISO 19085-1:2021, 4.8 applies with the following additions.

As an exception, non-return valves are not required on pneumatic cylinders used for workpiece clamping.

4.9 Manual reset control

ISO 19085-1:2021, 4.9 does not apply.

4.10 Standstill detection and monitoring

ISO 19085-1:2021, 4.10 does not apply.

4.11 Machine moving parts speed monitoring

ISO 19085-1:2021, 4.11 applies.

4.12 Time delay

ISO 19085-1:2021, 4.12 applies.

4.13 Teleservice

ISO 19085-1:2021, 4.13 does not apply.

4.14 Power-operated adjustment of the saw blades and the rip fence

Subclause specific to this document.

4.14.1 Risk of contact between the saw blades and the rip fence

Power-operated movements for adjusting the saw blades and the rip fence shall only be possible under pre-set electronic control after actuation of an initiation control device or by hold-to-run control.

The SRP/CS for initiation control shall achieve $PL_r = c$.

Within a collision area, i.e. where the position of the rip fence is so close to the saw blade that contact between the rip fence and the saw blade is possible, respective approach movements shall only be possible by hold-to-run control, whereby the maximum speed of adjustment shall be 15 mm/s for linear and 5°/s for rotational movements (no PL required for speed monitoring).

The SRP/CS for detection of the position of the rip fence within the collision area shall achieve $PL_r = c$.

Where power-operated movements are activated by hold-to-run control, no more than one power-operated movement at a time shall be possible.

NOTE The simultaneous adjustment of height and tilt of the saw blade is considered as one single movement.

Saw blade rotation is allowed during power-operated adjustments.

The SRP/CS for limitation of concurrent movements under hold-to-run control shall achieve $PL_r = b$.

Unexpected start of power-operated movements under pre-set electronic control shall be prevented after the pre-set position has been reached.

The SRP/CS for prevention of unexpected start shall achieve $PL_r = c$. This can be achieved, for example, by a time delay device which, after actuation of the initiation control for power-operated movements under pre-set electronic control, shall cut power to the actuators with a time delay set to the maximum possible adjustment time.

Verification is done by checking the relevant drawings and circuit diagrams, and inspection and relevant functional testing of the machine.

4.14.2 Crushing hazard for the body

Crushing hazards for the body between power-operated moving parts of the rip fence and other parts of the machine, for example, the sliding table or machine frame, shall be avoided by either

- a) a hold-to-run control for the movement of the rip fence within the crushing area for the body,

- b) a mechanically actuated trip device (PSPE), which shall
 - 1) be located on the other parts of the machine, for example, frame, at maximum 50 mm below table level, and
 - 2) have a crushing force that shall not exceed 400 N; or
- c) reduction of the force of the fence toward the other parts of the machine to a maximum of 400 N.

NOTE Crushing hazards for the body according to ISO 13854:2017 occur if power-operated moving parts go below a safety distance of 500 mm toward fixed parts.

The SRP/CS for detection of the position of the rip fence within the crushing area for the body shall achieve $PL_r = c$.

The SRP/CS for limiting the power-operated movement force shall achieve $PL_r = c$.

Verification is done by checking the relevant drawings and circuit diagrams, measurement, and inspection and relevant functional testing of the machine.

4.14.3 Crushing and shearing hazard for the arm, hand or finger

Crushing and shearing hazards for the arm, hand and fingers between power-operated moving parts of the rip fence, and other parts of the machine, for example, the sliding table or machine frame, shall be avoided by either

- a) a hold-to-run control device for the movement of the rip fence within the crushing area for the arm/hand/finger, or
- b) a mechanically actuated trip device (PSPE), which shall
 - 1) be located on the other parts of the machine, for example, frame or integrated sliding table at table level, and
 - 2) whose crushing force shall not exceed 150 N.

NOTE Crushing hazards for arm, hand and finger according to ISO 13854:2017 occur if power-operated moving parts go below a safety distance of 120 mm for arm and hand and 25 mm for finger toward fixed parts.

The SRP/CS for detection of the shearing and crushing area for arm/hand/finger shall achieve $PL_r = c$.

The SRP/CS for limiting the power-operated movement force shall achieve $PL_r = c$.

Verification is done by checking the relevant drawings and circuit diagrams, measurement, and inspection and relevant functional testing of the machine.

5 Safety requirements and measures for protection against mechanical hazards

5.1 Stability

ISO 19085-1:2021, 5.1, applies with the following additions.

The machines shall pass the stability test required in [Annex C](#).

5.2 Risk of break-up during operation

ISO 19085-1:2021, 5.2, applies with the following additions.

The machine table slot close to the tool shall be lined with easily machinable material (see ISO 19085-1:2021, 3.3).

5.3 Tool and tool fixing design

5.3.1 General

ISO 19085-1:2021, 5.3.1 applies.

5.3.2 Spindle locking

ISO 19085-1:2021, 5.3.2 applies.

5.3.3 Circular saw blade fixing device

ISO 19085-1:2021, 5.3.3 applies with the following additions.

As an exception, the scoring saw blade may be fixed with a nut and without additional flanges.

5.3.4 Flange dimension for circular saw blades

ISO 19085-1:2021, 5.3.4 applies.

5.3.5 Fixing device for milling tools

Subclause specific to this document.

For machines with a device for grooving with milling tools, milling tool flanges shall be provided.

The outer diameter of the flanges shall be at least 1,4 times the bore diameter of the milling tool.

Loosening of the milling tool shall be prevented, for example, by using a positive connection between the front flange and the spindle.

Verification is done by checking relevant drawings, measurement and inspection of the machine.

5.4 Braking

5.4.1 Braking of tools

ISO 19085-1:2021, 5.4.1 applies with the following addition.

The braking function shall be tested in accordance with [Annex D](#).

When conducting the test for braking function on machines with the device for grooving with milling tool, it shall be determined whether the condition with the greatest kinetic energy will be achieved with a saw blade or a milling tool.

5.4.2 Maximum run-down time

ISO 19085-1:2021, 5.4.2 applies.

5.4.3 Brake release

ISO 19085-1:2021, 5.4.3 applies.

5.5 Safeguards

5.5.1 Fixed guards

ISO 19085-1:2021, 5.5.1 applies.