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**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 documents 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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 39, *Machine tools*, Subcommittee SC 4, *Woodworking machines*.

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](http://www.iso.org/members.html).

This document is intended to be used in conjunction with ISO 19085-1:2017, which gives requirements common to different machine types.

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

## Introduction

The ISO 19085 series of International Standards provides technical safety requirements for the design and construction of woodworking machinery. It concerns designers, manufacturers, suppliers and importers of the machines specified in the Scope. It also includes a list of informative items that the manufacturer will need to give to the user.

This document is a type-C standard as stated in ISO 12100.

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, 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 ISO 19085 applicable to that type, together with the relevant requirements from ISO 19085-1:2017, to the extent specified in the Scope of the applicable part of ISO 19085.

As far as possible, in parts of ISO 19085 other than ISO 19085-1:2017, safety requirements are referenced to the relevant sections of ISO 19085-1:2017, to avoid repetition and reduce their length. The other parts contain replacements and additions to the common requirements given in ISO 19085-1:2017.

Thus, [Clauses 5, 6, 7](#) and [8](#) with their subclauses and the annexes of this part can either

— confirm as a whole,

— confirm with additions,

— exclude in total, or

— replace with specific text

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the corresponding subclauses or annexes of ISO 19085-1:2017.

This interrelation is indicated in the first paragraph of each subclause or annex right after the title by one of the following statements:

— “This subclause of ISO 19085-1:2017 applies.”;

— “This subclause of ISO 19085-1:2017 applies with the following additions.” or “This subclause of ISO 19085-1:2017 applies with the following additions, subdivided into further specific subclauses.”;

— “This subclause of ISO 19085-1:2017 does not apply.”;

— “This subclause of ISO 19085-1:2017 is replaced by the following text.” or “This subclause of ISO 19085-1:2017 is replaced by the following text, subdivided into further specific subclauses.”.

Specific subclauses and annexes in this part without correspondence to ISO 19085-1:2017 are indicated by the introductory sentence: “Subclause (or Annex) specific to this part of ISO 19085.”

[Clauses 1, 2, 4](#) replace the correspondent clauses of ISO 19085-1:2017, with no need for indication since they are specific to each part of the series.

NOTE Requirements for tools are given in EN 847-1:2017.

# Woodworking machines — Safety —

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

### 1 Scope

This document gives the safety requirements and measures for stationary and displaceable circular saw benches (with or without sliding table and/or demountable power feed unit), also known as “table saws” (in the USA), hereinafter referred to as “machines”, designed to cut wood and material with similar physical characteristics to wood.

NOTE 1 For the definition of stationary and displaceable machine, see ISO 19085-1:2017, 3.4 and 3.5.

It deals with all significant hazards, hazardous situations and events as listed in [Clause 4](#) relevant to these machines when they are operated, adjusted and maintained as intended and under the conditions foreseen by the manufacturer including reasonably foreseeable misuse. Also, transport, assembly, dismantling, disabling and scrapping phases are taken into account.

NOTE 2 For relevant but not significant hazards, e.g. sharp edges of the machine frame, see ISO 12100:2010.

It is also applicable to machines fitted with one or more of the following devices, or working unit, 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 work-piece clamping device.

NOTE 3 Circular saw benches are used for ripping, cross cutting, dimensioning and grooving.

This document does not apply to:

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

NOTE 4 Building site saws (contractor saws) are covered by the requirements of ISO 19085-10:2018.

- b) hand held 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 before the date of its publication as an International Standard;
- e) transportable machines with a maximum saw blade diameter of  $\leq 315$  mm.

NOTE 5 Transportable motor-operated electric tools are dealt with in IEC 62841-1:2014 and IEC 62841-3-1:2014.

## 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 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 7960:1995, *Airborne noise emitted by machine tools — Operating conditions for woodworking machines*

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

ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 19085-1:2017, *Woodworking machines – Safety – Part-1: common requirements*

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

IEC 60204-1:2005, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 61800-5-2:2007, *Adjustable speed electrical power drive systems — Part 5-2: Safety requirements — Functional*

[ISO 19085-9:2019](https://standards.iteh.ai/catalog/standards/sist/f0ada239-60f7-4594-8e96-415968df683c/iso-19085-9-2019)

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## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010, ISO 13849-1:2015, ISO 19085-1:2017 and the following apply.

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

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

### 3.1 circular saw bench table saw

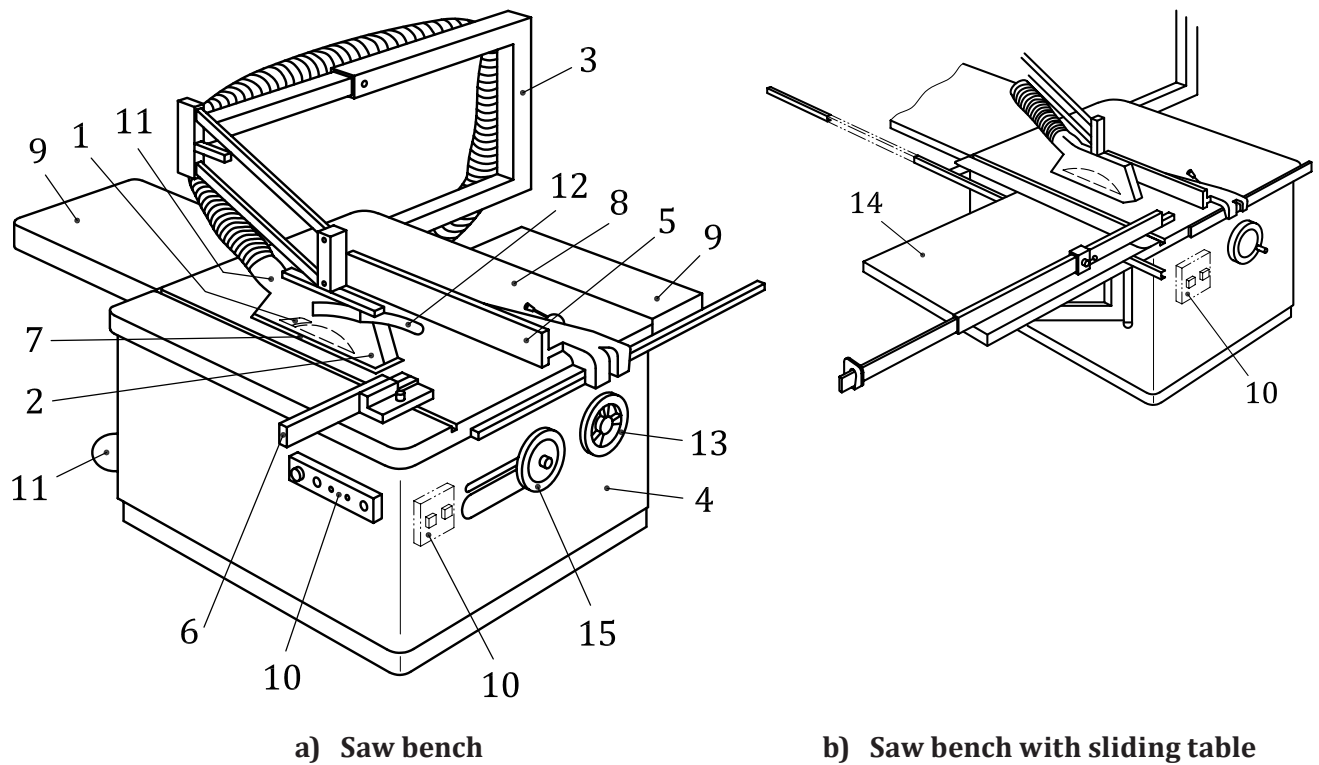
hand-fed machine fitted with a single main circular saw blade which is fixed in position during the cutting operation, and a horizontal table fixed during operation

Note 1 to entry: Example is given in [Figure 1](#). The saw blade is mounted on a horizontal spindle below the table.

### 3.2 grooving

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



**Key**

1	ripping knife	9	extension table
2	saw blade guard	10	controls
3	saw blade guard support	11	exhaust outlet
4	fixed guard beneath table	12	push stick
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****3.3****initiation control**

control which, after actuation, enables the provision of power to specific machine actuators, e.g. by a programmable logic control

**4 List of significant hazards**

This clause contains all significant hazards, hazardous situations and events (see ISO 12100:2010), identified by risk assessment as significant for the machines as defined in Clause 1 and which require action to eliminate or reduce the risk. This document deals with these significant hazards by defining safety requirements and/or measures or by reference to relevant standards. These hazards are listed in [Table 1](#).

Table 1 — List of significant hazards

No.	Hazards, hazardous situations and hazardous events	ISO 12100:2010	Relevant section of ISO 19085-9:2019
<b>1</b>	<b>Mechanical hazards</b> related to — Machine parts or work-pieces due to		
	a) shape	6.2.2.1, 6.2.2.2, 6.3	<a href="#">6.3, 6.6, 6.8, 6.9.2, 6.10, 6.11, 7.5</a>
	b) relative location		<a href="#">5.2, 6.6, 7.5, 8.3.2, Annex I</a>
	d) mass and velocity (kinetic energy of elements in controlled or uncontrolled motion)		<a href="#">5.13, 6.4, 6.6</a>
	e) mechanical strength		<a href="#">6.2, 6.3, 6.4, 6.9, 6.10, Annex D, Annex F</a>
	— Accumulation of energy inside the machinery due to		
	f) liquids and gases under pressure	6.2.10, 6.3.5.4	<a href="#">6.8, 7.7, 7.8</a>
1.1	Crushing hazard		<a href="#">6.6.4</a>
1.2	Shearing hazard		<a href="#">6.6.4</a>
1.3	Cutting or severing hazard		<a href="#">6.6.2, 6.10, 6.11, 8.3.2</a>
1.4	Entanglement hazard		<a href="#">6.6, 8.3.2</a>
1.5	Drawing-in or trapping hazard		<a href="#">6.6, 8.3.2</a>
1.6	Impact hazard		<a href="#">6.7, 8.3.2</a>
1.8	Friction or abrasion hazard		<a href="#">8.3.2</a>
<b>2</b>	<b>Electrical hazards</b> due to		
2.1	Contact of persons with live parts (direct contact)	6.2.9, 6.3.5.4	<a href="#">7.4</a>
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	6.2.9	<a href="#">7.4</a>
2.4	Electrostatic phenomena	6.2.9	<a href="#">7.9</a>
<b>4</b>	<b>Hazards generated by noise</b> , resulting in		
4.1	Hearing loss (deafness), other physiological disorders (loss of balance, loss of awareness)	6.2.2.2, 6.3	<a href="#">7.2</a>
4.2	Interference with speech communication, acoustic signals		<a href="#">8.3</a>
<b>6</b>	<b>Hazards generated by radiation</b>		
6.5	Lasers	6.3.4.5	<a href="#">7.10</a>
<b>7</b>	<b>Hazards generated by materials and substances</b> (and their constituent elements) processed or used by the machinery		
7.1	Hazards from contact with or inhalation of harmful fluids and dusts	6.2.3, 6.2.4	<a href="#">7.3, 8.3</a>
7.2	Fire hazard	6.2.4	<a href="#">7.1</a>
<b>8</b>	<b>Hazards generated by neglecting ergonomic principles</b> in machinery design		
8.1	Unhealthy postures or excessive effort	6.2.7, 6.2.8, 6.2.11.12, 6.3.5.5, 6.3.5.6	<a href="#">5.2, 7.5</a>
8.2	Hand-arm or foot-leg anatomy	6.2.8.3	<a href="#">7.5</a>
8.4	Local lighting	6.2.8.6	<a href="#">8.3</a>
8.5	Mental overload and underload, stress	6.2.8.5	<a href="#">8.3</a>
8.6	Human error, human behaviour	6.2.8, 6.2.11.8, 6.2.11.10, 6.3.5.2, 6.4	<a href="#">8.3</a>

Table 1 (continued)

No.	Hazards, hazardous situations and hazardous events	ISO 12100:2010	Relevant section of ISO 19085-9:2019
8.7	Design, location or identification of manual controls	6.2.8, f), 6.2.11.8	<a href="#">5.2, 7.5</a>
8.8	Design or location of visual display units	6.2.8, 6.4.2	<a href="#">5.2, 7.5</a>
9	<b>Combination of hazards</b>	6.3.2.1	<a href="#">5.1, 6.6, 7.13, 7.14</a>
10	<b>Unexpected start up</b> , unexpected overrun/overspeed (or any similar malfunction) from		
10.1	Failure/disorder of the control system	6.2.11, 6.3.5.4	<a href="#">5.1, 7.13</a>
10.2	Restoration of energy supply after an interruption	6.2.11.4	<a href="#">5.8, 7.7</a>
10.3	External influences on electrical equipment	6.2.11.11	<a href="#">5.1, 7.9</a>
10.6	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities, see 8.6)	6.2.8, 6.2.11.8, 6.2.11.10, 6.3.5.2, 6.4	<a href="#">7.5, 8.3</a>
11	<b>Impossibility of stopping the machine in the best possible conditions</b>	6.2.11.1, 6.2.11.3, 6.3.5.2	<a href="#">5.4, 7.12</a>
12	<b>Variations in the rotational speed of tools</b>	6.2.2.2, 6.2.3	<a href="#">5.7</a>
13	<b>Failure of the power supply</b>	6.2.11.1, 6.2.11.4	<a href="#">5.8</a>
14	<b>Failure of the control circuit</b>	6.2.11, 6.3.5.4	<a href="#">5.1</a>
15	<b>Errors of fitting</b>	6.2.7, 6.4.5	<a href="#">7.12</a>
16	<b>Break-up during operation</b>	6.2.3	<a href="#">6.2</a>
17	<b>Falling or ejected objects or fluids</b>	6.2.3, 6.2.10	<a href="#">6.9</a>
18	<b>Loss of stability/overturning of machinery</b>	6.3.2.6	<a href="#">6.1, 8.3, Annex C</a>

## 5 Safety requirements and measures for controls

### 5.1 Safety and reliability of control systems

This subclause of ISO 19085-1:2017 applies ([Annex A](#) is replaced).

### 5.2 Control devices

This subclause of ISO 19085-1:2017 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 and/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.

# ISO 19085-9:2019(E)

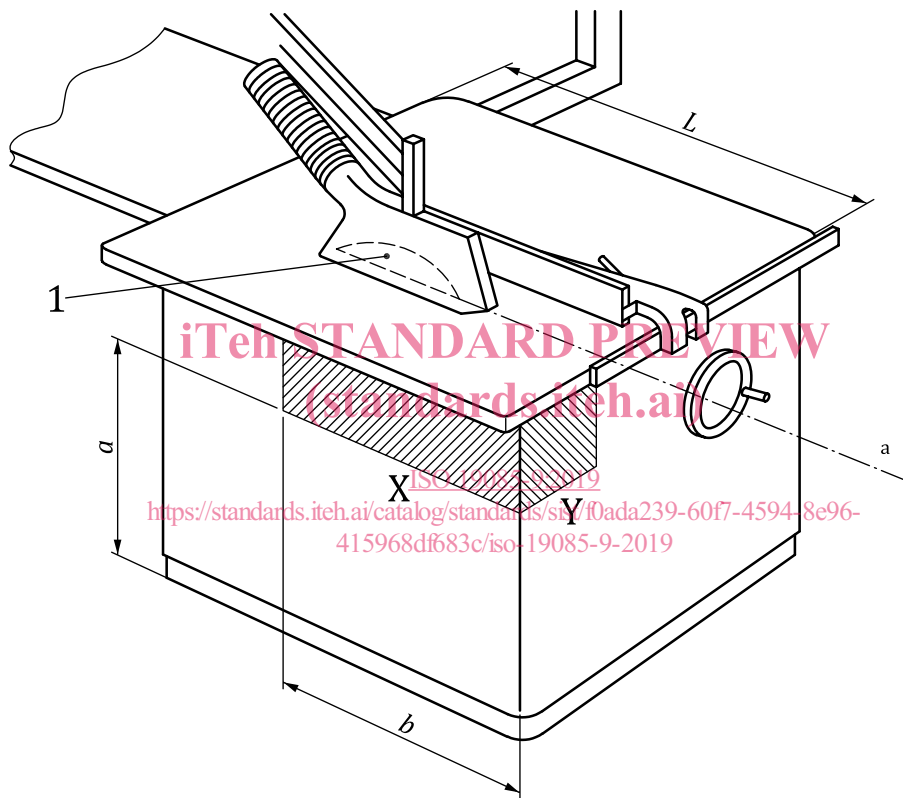
The shaded areas X and Y are located below the table at a distance of at least 50 mm from the table top and more than 600 mm above the floor (see *a* in Figure 2) and:

- i) on the left side of the machine (area X) and extending not more than half of the table length, *L* (see *b* in Figure 2);
- ii) 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 surface is at a distance from the floor level not exceeding 1 800 mm.

Verification: By checking the relevant drawings, measurement and inspection of the machine.



$$a \geq 600 \text{ mm}$$

$$b \leq \frac{1}{2} L$$

### Key

- 1 saw blade
- 2 cutting line
- L* length of machine table
- X left side controls area
- Y front side controls area (on the left of cutting line)

**Figure 2 — Position of control devices**

### 5.3 Start

This subclause of ISO 19085-1:2017 applies with the following additions.

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

The SRP/CS for interlocking between the scoring saw blade drive and the main saw blade drive shall achieve  $PL_R = c$ .

*Verification:* By checking the relevant drawings and/or circuit diagrams, inspection of the machine and relevant functional testing of the machine.

## 5.4 Safe stops

### 5.4.1 General

This subclause of ISO 19085-1:2017 applies.

### 5.4.2 Normal stop

This subclause of ISO 19085-1:2017 applies

### 5.4.3 Operational stop

This subclause of ISO 19085-1:2017 does not apply.

### 5.4.4 Emergency stop

This subclause of ISO 19085-1:2017 applies.

## 5.5 Braking function of tool spindles

This subclause of ISO 19085-1:2017 applies. <https://standards.iteh.ai/catalog/standards/sist/f0ada239-60f7-4594-8e96-415968df683c/iso-19085-9-2019>

## 5.6 Mode selection

This subclause of ISO 19085-1:2017 does not apply.

## 5.7 Spindle speed changing

### 5.7.1 Spindle speed changing by changing belts on the pulleys

This subclause of ISO 19085-1:2017 applies.

### 5.7.2 Spindle speed changing by incremental speed change motor

This subclause of ISO 19085-1:2017 applies.

### 5.7.3 Infinitely variable speed by frequency inverter

This subclause of ISO 19085-1:2017 applies.

## 5.8 Failure of any power supply

This subclause of ISO 19085-1:2017 applies.

## 5.9 Manual reset control

This subclause of ISO 19085-1:2017 does not apply.

## 5.10 Enabling control

This subclause of ISO 19085-1:2017 does not apply.

## 5.11 Machine moving parts speed monitoring

This subclause of ISO 19085-1:2017 is replaced by the following text.

The control for speed monitoring shall ensure that, as soon as the real speed exceeds the speed limit, the drive shall be stopped automatically in stop category 0 according to IEC 60204-1:2005, 9.2.2.

For software requirements, see ISO 13849-1:2015, 4.6.

For speed monitoring of PDS(SR) (power drive system, safety-related), IEC 61800-5-2:2007, 4.2.3.4 (safely limited speed, SLS) applies.

The SRP/CS for limited speed monitoring of machine moving parts (except tools) shall achieve  $PL_r = b$ .

*Verification:* By checking the relevant drawings and/or circuit diagrams, measurement, inspection of the machine and relevant functional testing of the machine.

## 5.12 Time delay

This subclause of ISO 19085-1:2017 applies.

## 5.13 Power-operated adjustment of the saw blades and/or fences

Subclause specific to this part of ISO 19085.

Power-operated movements for adjusting the saw blades and/or the fences, e.g. rip fence and/or cross-cut fence, shall only be possible after actuation of either an initiation control device or a hold-to-run control device.

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

Within a collision area, where the position of rip fence is as close to the saw blade that contact between the rip fence and the saw blade is possible, movement of the saw blade toward the rip fence and of the rip fence toward the saw blade 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 (see also 5.11).

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, not more than one power-operated movement at a time shall be possible.

NOTE 1 The simultaneous adjustment of height and tilt of the saw blade is considered to be one single movement.

NOTE 2 Saw blade rotation is allowed during power-operated adjustments.

The SRP/CS for the movement limitation shall achieve  $PL_r = b$ .

Unexpected start of power-operated movements under pre-set electronic control shall be prevented, e.g. by using a time delay device cutting power to the actuators with a time delay set to the maximum adjustment time.

The safety-related part of the corresponding control system shall achieve  $PL_r = c$ .

*Verification:* By checking the relevant drawings and/or circuit diagrams, inspection of the machine and relevant functional testing of the machine.

## 6 Safety requirements and measures for protection against mechanical hazards

### 6.1 Stability

#### 6.1.1 Stationary machines

This subclause of ISO 19085-1:2017 applies.

#### 6.1.2 Displaceable machines

This subclause of ISO 19085-1:2017 applies.

### 6.2 Risk of break-up during operation

This subclause of ISO 19085-1:2017 applies with the following additions.

The machine table slot close to the tool shall be lined with easily machinable material (see ISO 19085-1:2017, 3.3).

*Verification:* By checking the relevant drawings and inspection of the machine.

### 6.3 Tool holder and tool design

#### 6.3.1 General

This subclause of ISO 19085-1:2017 applies with the following additions.

Saw spindles shall be manufactured in steel with an ultimate tensile strength of at least 580 N mm<sup>-2</sup>.

*Verification:* By checking the relevant drawings, documents and by measurement.

#### 6.3.2 Spindle locking

This subclause of ISO 19085-1:2017 applies.

#### 6.3.3 Circular saw blade fixing device

This subclause of ISO 19085-1:2017 applies.

#### 6.3.4 Flange dimension for circular saw blades

This subclause of ISO 19085-1:2017 applies.

#### 6.3.5 Fixing device for milling tools

Subclause specific to this part of ISO 19085.

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

The 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, e.g. by using a positive connection between the front flange and the spindle.

*Verification:* By checking the relevant drawings, by measurement and inspection of the machine.