
Woodworking machines — Safety —
Part 16:
Table band saws and band re-saws

Machines à bois — Sécurité —

Partie 16: Scies à ruban à table et scies à ruban à refendre

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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).

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).

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.

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 document is intended to be used in conjunction with ISO 19085-1:2021, 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.

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 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.

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 (regulators, accident prevention organisations, market surveillance etc.)

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, 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 19085-1:2021, to the extent specified in the Scope of the applicable part of ISO 19085.

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

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

For [Clauses 4 to 7](#) and the annexes, ISO 19085-1:2021, Clauses 4 to 7 and Annexes, can be:

- 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.”;

- “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.”.

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Woodworking machines — Safety —

Part 16: Table band saws and band re-saws

1 Scope

This document gives the safety requirements and measures for table band saws and band resaws, with manual loading and/or unloading and suitable for continuous production use, hereinafter referred to as “machines”.

The machines are designed to cut solid wood and material with similar physical characteristics to wood.

It deals with all significant hazards, hazardous situations and events, 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. Also, transport, assembly, dismantling, disabling and scrapping phases have been taken into account.

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

- a) device to tilt the table;
- b) device to tilt the saw unit.

This document does not apply to:

- 1) machines driven by combustion engines or power take offs (PTO);
- 2) log band sawing machines;

NOTE Log band sawing machines are covered by EN 1807-2:2013.

- 3) horizontal band saws and band resaws;
- 4) machines designed for cross-cutting of firewood.

This document does not deal with hazards related to the combination of a single machine being used with any other machine (as part of a line).

This document is not applicable to machines intended for use in potentially explosive atmospheres or to machines manufactured prior to the date of its publication.

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 4871:1996, *Acoustics — Declaration and verification of noise emission values of machinery and equipment*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010, ISO 13849-1:2015, ISO 19085-1:2021 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
band sawing machine**
sawing machine with one saw blade in the form of a continuous band mounted on and running between two or more band saw blade wheels

**3.2
table band saw**
hand-fed *band sawing machine* (3.1) with a fixed or tiltable table or a tiltable saw unit

Note 1 to entry: See [Figures 1, 3](#) and [4](#).

**3.3
band resaw**
band sawing machine (3.1) with integrated feed of the workpiece

Note 1 to entry: See [Figure 2](#).

Note 2 to entry: Band resaws can be in vertical or tilted orientation.

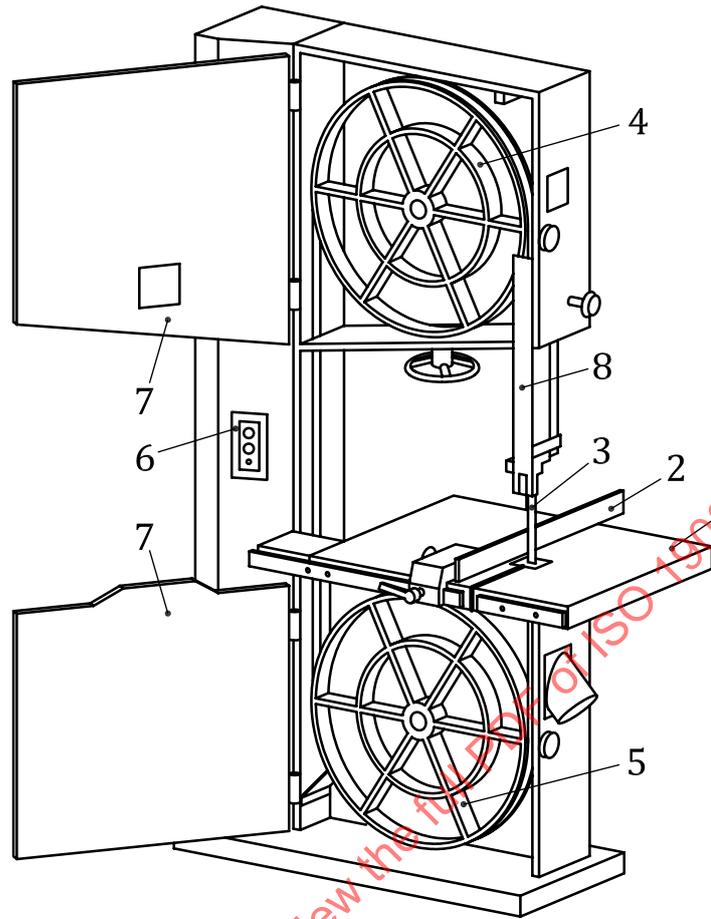
**3.4
band saw blade straining**
force exerted on the band saw blade to keep it in position on the band saw blade wheels during cutting

Note 1 to entry: See [Figure 6](#).

**3.5
band saw blade tracking**
means used to maintain the position of the band saw blade on the band saw blade wheels

Note 1 to entry: See [Figure 5](#).

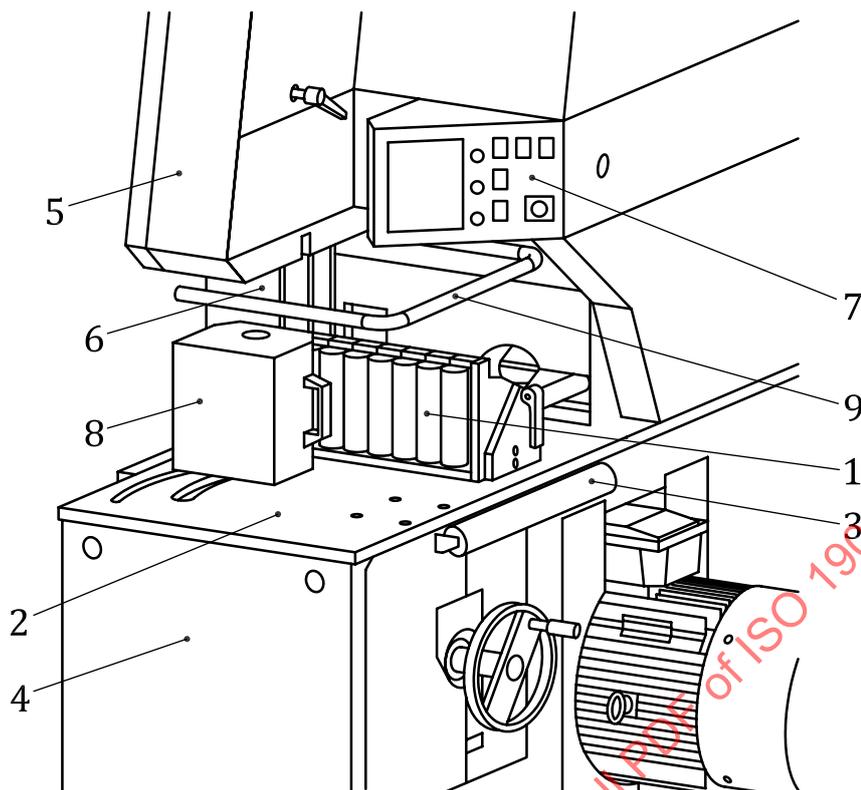
**3.6
tracking mode**
mode to allow tracking adjustment during un-braked run-down of the power-driven wheel, e.g. by adjustment of the inclination of one of the band saw blade wheels



Key

- | | | | |
|---|--------------------------|---|---|
| 1 | table | 5 | bottom band saw blade wheel |
| 2 | adjustable fence | 6 | start and stop controls |
| 3 | band saw blade | 7 | guards for the band saw blade wheels |
| 4 | top band saw blade wheel | 8 | adjustable guard for the band saw blade |

Figure 1 — Parts of a table band saw (guards opened, e.g. for tool change)



Key

- | | | | |
|---|--------------------------------------|---|---|
| 1 | workpiece guiding system (fence) | 6 | adjustable guard for the band saw blade |
| 2 | machine table | 7 | start and stop controls |
| 3 | feeding roll | 8 | feed device |
| 4 | guard below the table | 9 | trip device |
| 5 | guards for the band saw blade wheels | | |

Figure 2 — Example of a band resaw

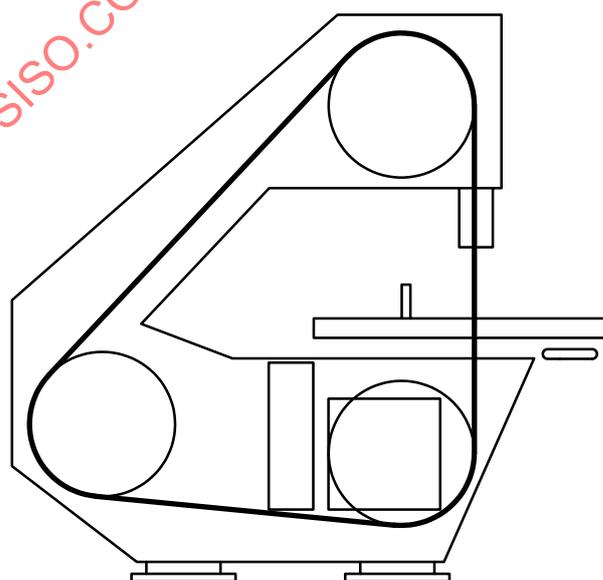


Figure 3 — Table band saw with three band saw blade wheels

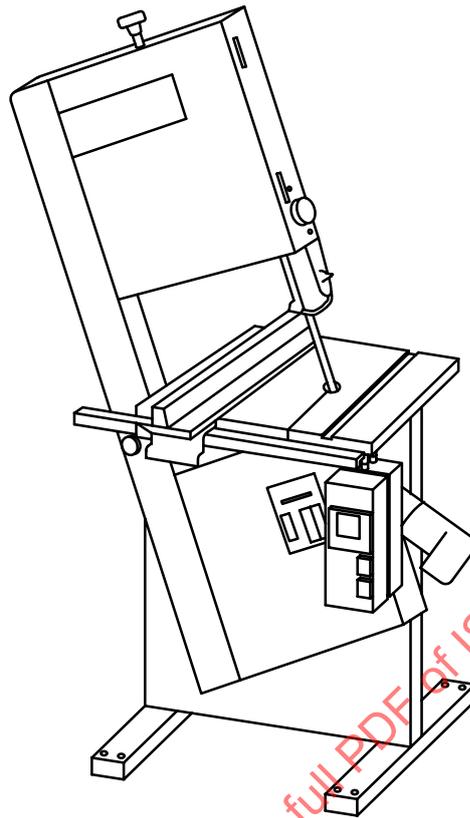
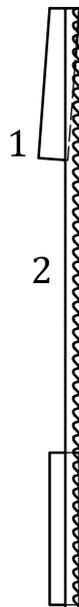


Figure 4 — Table band saw with tiltable saw unit



Key

- 1 tiltable band saw wheel
- 2 band saw blade

Figure 5 — Example of means for band saw blade tracking

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 replaces ISO 19085-1:2021, Table B.1.

4.2 Control devices

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

All control devices for the normal operation of the machine (including the emergency stop control if required) shall be positioned at the infeed side either on a fixed part of the machine or on a moveable control panel.

On band resaws an additional emergency stop control device shall be positioned on the outfeed side of the machine.

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

4.3 Start

4.3.1 Direct start

ISO 19085-1:2021, 4.3.1, applies.

4.3.2 Start via control power-on

ISO 19085-1:2021, 4.3.2, applies.

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, applies with the following additions.

If tracking mode is provided the following requirements apply.

- a) The guards for the band saw blade wheels shall be interlocked with guard locking. The release of the guard locking shall be interlocked with the standstill condition of the tool drive.
- b) To allow observation of the band saw tracking, the brake of the tool drive may be overridden.
- c) To avoid productive operation with disabled brakes, the tool drive shall not run for more than 3 s.

In case of realization of b), the SRP/CS for the overriding of the tool drive brake shall achieve $PL_r = c$.

The SRP/CS for the run time limitation shall achieve $PL_r = c$.

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

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.

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, applies.

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.

5 Safety requirements and measures for protection against mechanical hazards

5.1 Stability

ISO 19085-1:2021, 5.1, applies.

5.2 Risk of break-up during operation

ISO 19085-1:2021, 5.2, applies.

5.3 Tool and tool fixing design

5.3.1 General

ISO 19085-1:2021, 5.3.1, does not apply.

5.3.2 Spindle locking

ISO 19085-1:2021, 5.3.2, does not apply.

5.3.3 Circular saw blade fixing device

ISO 19085-1:2021, 5.3.3, does not apply.

5.3.4 Flange dimensions for circular saw blades

ISO 19085-1:2021, 5.3.4, does not apply.

5.3.5 Band saw blade straining and tracking

Subclause specific to this document.

Means shall be provided to adjust the strain of the band saw blade. Indication of the strain shall be provided [see also [Figure 6](#) and [7.2.2 a\)](#)].

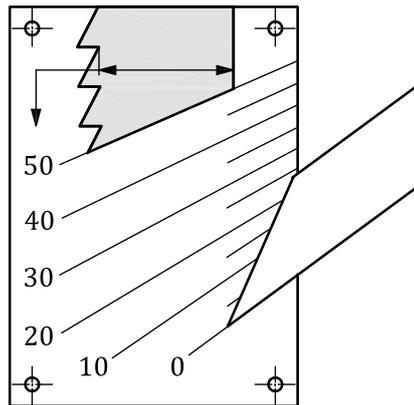
A compensation device shall be provided to maintain the strain in the band saw blade during normal operation.

A means of tilting one band saw blade wheel shall be provided to ensure that the band saw blade can be tracked (see [Figure 5](#)).

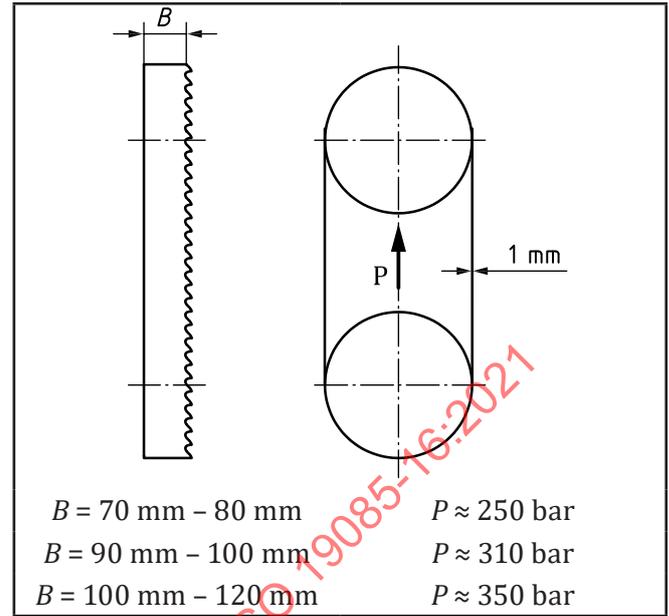
NOTE Band saw blade tracking can be made with open guards for the band saw blade wheels by rotating the wheels by hand, (see [5.4.3](#) for brake release) or with closed guards for the band saw blade wheels during unbraked run-down in tracking mode (see [4.6](#) for mode selection).

On machines provided with tracking mode, provision shall be made for checking the position of the band saw blade, e.g. by means of marks on the machine table or by a scale, or by an inspection window in the guard of the upper band saw blade wheel.

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



a) Mechanical straining system



b) Hydraulic straining system

Figure 6 — Examples of marking and indication

5.3.6 Band saw blade guides

Subclause specific to this document.

Machines shall be equipped with at least two sets of band saw blade guides, with at least one above and one below the workpiece support.

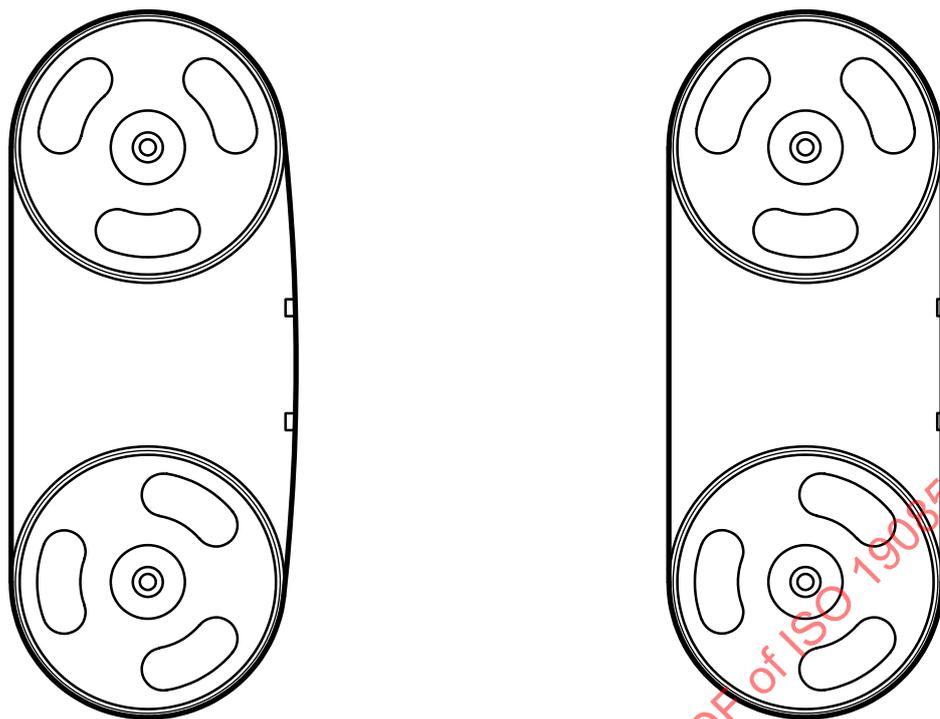
NOTE For examples of types of guides, see [Figure 7](#).

The set of guides above the workpiece support shall be adjustable in height so that it can be moved towards the workpiece or workpiece support level and blocked in that position.

On machines intended for use with un-tensioned band saw blades, a rear guide, e.g. a thrust wheel, shall be fitted above the workpiece to maintain the band saw blade in position during operation.

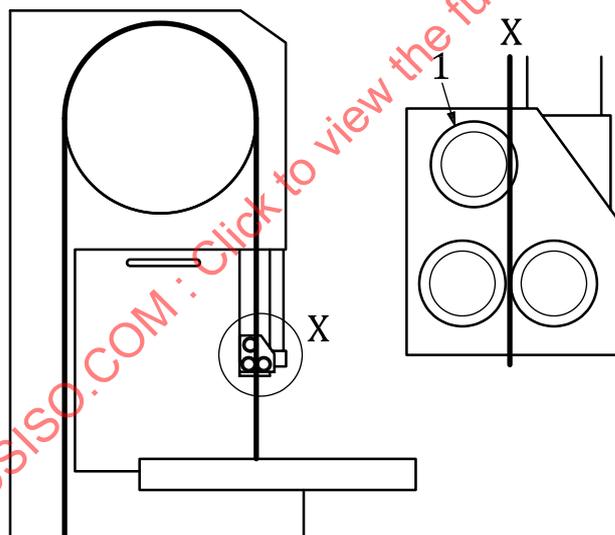
Machines intended for use with tensioned band saw blades shall be fitted with devices that ensure that at least the bottom band saw blade wheel is cleaned during operation, e.g. brushes or scrapers. Where the cleaning devices are manually adjusted, this shall be possible without the aid of a tool.

Band resaws shall be fitted with a system which applies anti-adherent fluid to the band saw blade and/or the band saw blade wheels during machine operation. The reservoir of anti-adherent fluid shall be of adequate size for continuous operation of at least four hours with the flow rate foreseen for the lubrication.



a) Pressure guides

b) Cheek guides



c) Roller guide (thrust wheel)

Key

1 thrust wheel behind the band saw blade

NOTE Workpiece supports are not shown in [Figures 7 a\)](#) and [7 b\)](#).

Figure 7 — Examples of band saw blade guides

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

5.4 Braking

5.4.1 Braking of tools

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

When designing the braking system and selecting the required band saw blade and drive belts, if any, the inertia of the free running wheels shall be taken into account in order to avoid overloading of the band saw blade and drive belts.

NOTE For residual risk due to broken band saw blade and drive belt (if fitted) and upper free wheel running, see 7.3.2 a) 3).

Verification: By checking relevant drawings, calculation, inspection of the machine and relevant functional testing of the machine

5.4.2 Maximum run-down time

ISO 19085-1:2021, 5.4.2, applies with the following additions.

Where the run-up time exceeds 10 s the maximum run-down time shall be less than the run-up time but shall not exceed 30 s.

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.

5.5.2 Interlocking movable guards

5.5.2.1 General

ISO 19085-1:2021, 5.5.2.1, applies.

5.5.2.2 Movable guards with interlocking

ISO 19085-1:2021, 5.5.2.2, applies.

5.5.2.3 Movable guards with interlocking and guard locking

ISO 19085-1:2021, 5.5.2.3, applies.

5.5.3 Hold-to-run control

ISO 19085-1:2021, 5.5.3, does not apply.

5.5.4 Two-hand control

ISO 19085-1:2021, 5.5.4, does not apply.

5.5.5 Electro-sensitive protective equipment (ESPE)

ISO 19085-1:2021, 5.5.5, does not apply.

5.5.6 Pressure-sensitive protective equipment (PSPE)

ISO 19085-1:2021, 5.5.6, applies.

5.5.7 Enabling control

ISO 19085-1:2021, 5.5.7, does not apply.

5.6 Prevention of access to hazardous moving parts

ISO 19085-1:2021, 5.6, is replaced by the following text, subdivided into further specific subclauses.

5.6.1 Guarding of the non-cutting area of the band saw blade

Access to the top and bottom band saw blade wheels of the machine and to the area of the band saw blade where it is not involved in the cutting process shall be prevented by fixed and interlocked moveable guards (see [Figure 1](#)).

If the run-down time of the band saw blade exceeds 10 s, interlocking and guard locking for the movable guards shall be provided.

For machines fitted with tiltable tables or a tiltable saw unit, horizontal access to the part of the band saw blade between the table and the lower guard for the band saw blade wheel shall be prevented at all possible tilting angles by a fixed guard.

NOTE Such a fixed guard can contain movable elements connected to each other.

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

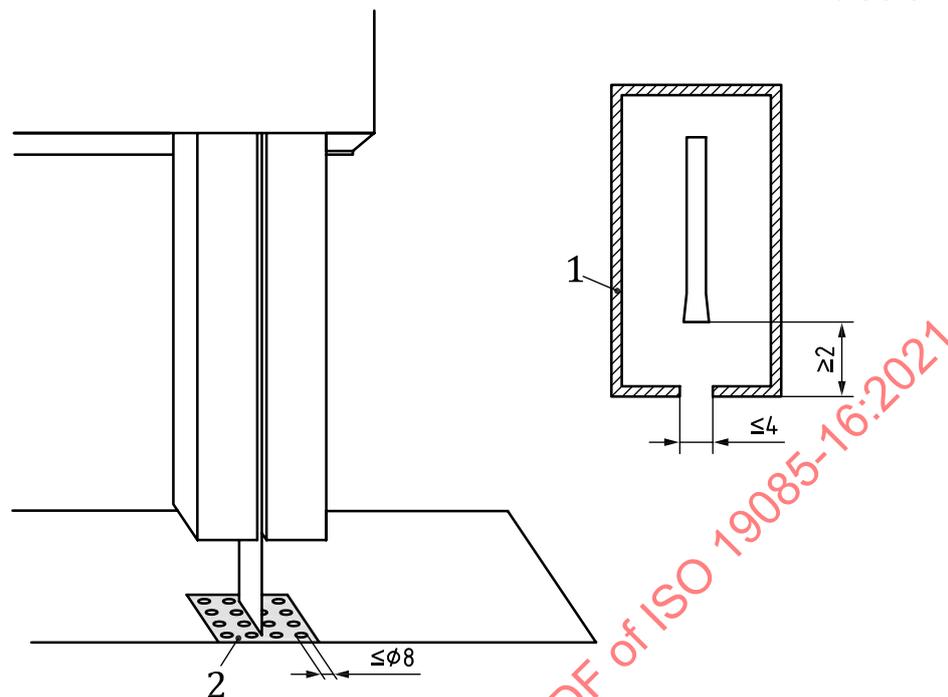
5.6.2 Guarding of the cutting area of the band saw blade

Access to the area of the band saw blade where it is involved in the cutting process shall be prevented by an adjustable guard which shall fulfil the following requirements (see [Figure 8](#)).

- a) It shall allow band saw blade changing without being removed from the machine.
- b) It shall be attached to and move with the top band saw blade guide.
- c) On table band saws, it shall enclose the band saw blade on all four sides, with the exception of a slot needed for tool change having a maximum width of 4 mm and a minimum distance of 2 mm to the band saw blade for all possible widths and positions of the band saw blade.
- d) On band resaws, it shall enclose the band saw blade at least on three sides, i.e. the cutting edge and at least two other sides (see also [Figure G.1](#)).
- e) Adjustment shall be possible without the aid of a tool.
- f) The adjustment mechanism shall be either self-locking or include a locking device.
- g) On table band saws, it shall be adjustable down to the table.
- h) On band resaws, it shall be adjustable at least down to the upper part of the integrated feed.
- i) Free vertical movement of it caused by gravity shall be limited to 30 mm s⁻¹.
- j) It shall pass the rigidity test in [Annex G](#).

Verification: By checking relevant drawings, inspection of the machine, measurement and performing the tests in [Annex G](#).

Dimensions in millimetres

**Key**

- 1 adjustable guard
- 2 table insert with holes

Figure 8 — Adjustable guard - Table band saw**5.6.3 Guarding of drives**

Access to hazardous movements of the drives, e.g. those for the tools or the feed mechanism, shall be prevented by fixed guards and, when access to the drives is required more than once a week, also by

- movable guards with interlocking, or
- movable guards with interlocking and guard locking, if the run-down time is higher than 10 s.

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

5.7 Impact hazard

ISO 19085-1:2021, 5.7, applies.

5.8 Clamping devices

ISO 19085-1:2021, 5.8, does not apply.

5.9 Measures against ejection**5.9.1 General**

ISO 19085-1:2021, 5.9.1, applies.

5.9.2 Guards material and characteristics

5.9.2.1 Choice of class of guards

ISO 19085-1:2021, 5.9.2.1, applies with the following additions.

For machines with a band saw blade wheel diameter of 1 000 mm or more guards of class A shall be used for all guards, otherwise guards of class B may be used.

As an exception, the flexible part of the adjustable guard (see [Figure 8](#), key 1) may be manufactured from spring steel of ultimate tensile strength of at least 1 200 N mm⁻² and with a thickness of at least 0,5 mm for machines with a band saw blade wheel diameter of less than 1 000 mm and for machines with a band saw blade wheel diameter of 1 000 mm or more with a thickness of at least 1 mm.

5.9.2.2 Guards of class A

ISO 19085-1:2021, 5.9.2.2, applies.

5.9.2.3 Guards of class B

ISO 19085-1:2021, 5.9.2.3, applies.

5.10 Workpiece supports and guides

ISO 19085-1:2021, 5.10, applies with the following additions, subdivided into further specific subclauses.

5.10.1 Requirements for table band saws

5.10.1.1 Table

The minimum size of the table shall be in accordance with the requirements of [Figure 9](#) and [Table 1](#).

The opening in the table around the band saw blade shall be fitted with a replaceable insert, made of wood, plastic, or light alloy. The replaceable insert shall have holes with a maximum diameter of 8 mm around the slot to facilitate the extraction of chips and dust (see [Figure 8](#), key item 2). The top surface of the insert shall be at the same height as the table surface.

On machines with tiltable tables the tilt shall be restricted to a maximum of 45° on both sides and the table shall be capable of being locked in position during use.

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

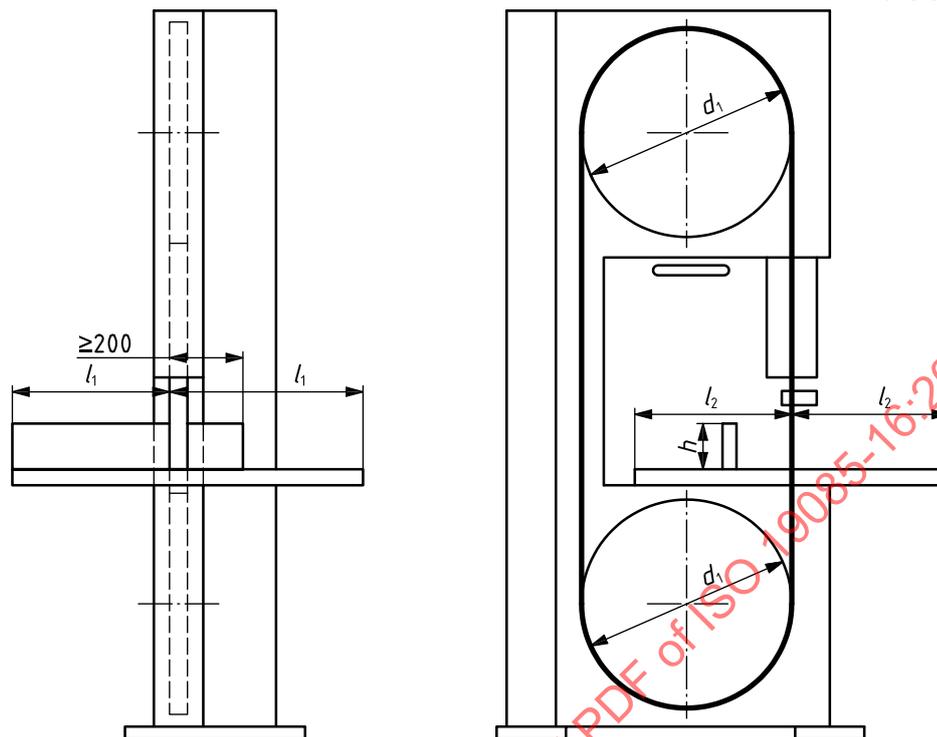
5.10.1.2 Parallel fence, workpiece guide

A parallel fence, adjustable and lockable without the aid of a tool, shall be provided for table band saws, except for machines designed only for cross cutting of round or irregular shaped workpieces.

At least on machines with tiltable tables, the machine shall be fitted with means for mounting the parallel fence on either side of the band saw blade. Changing the fence position from one side to the other shall be possible without the aid of a tool.

The parallel fence dimensions shall be in accordance with the requirements in [Figure 9](#) and [Table 1](#).

Dimensions in millimetres



Key

h parallel fence height

l_1 table length in feed direction

d_1 driven band saw wheels diameter

l_2 table width perpendicular to the feed direction

Figure 9 — Minimum table size - height and length of the parallel fence

Table 1 — Minimum table and parallel fence dimensions

Dimensions in millimetres

d_1	l_1	l_2	h
≤ 350	125	155	50
$350 < d_1 \leq 440$	135	180	50
$440 < d_1 \leq 540$	145	225	90
$540 < d_1 \leq 640$	200	250	90
$640 < d_1 \leq 740$	228	300	90
$740 < d_1 \leq 840$	250	355	90
> 840	300	375	90

It shall be possible to lower the adjustable guard down to the workpiece upper surface for any position of the parallel fence and all workpiece dimensions specified in the instruction handbook and 7.3.2 b) 1) applies.

An auxiliary fence or a double position fence shall be provided having a reduced height from 5 mm to 15 mm close to the workpiece.

NOTE This allows to lower the adjustable guard at least down to the reduced height of the parallel fence for narrow cuts of shallow workpieces.

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

5.10.2 Requirements for band resaws

5.10.2.1 Machines with tiltable table, tiltable workpiece guiding system or tiltable saw unit

On band resaws with tiltable table, tiltable workpiece guiding system or tiltable saw unit, the tiltable machine element shall be capable of being locked in any position during use.

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

5.10.2.2 Workpiece support

Band resaws shall be provided with a workpiece support on the infeed and outfeed side. The minimum length of the workpiece supports shall be half of the maximum length of the workpiece for which the machine is designed. The minimum width of the workpiece supports shall be the maximum width of the workpiece for which the machine is designed.

NOTE The supports can be, for example, flat or roller tables, belt conveyors.

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

5.10.2.3 Workpiece guiding system

Band resaws shall be provided with a workpiece guiding system at least on the infeed side, e. g. a parallel fence or rollers. The height of the guiding system shall be at least 60 % of the maximum height of the workpieces for which the machine is designed.

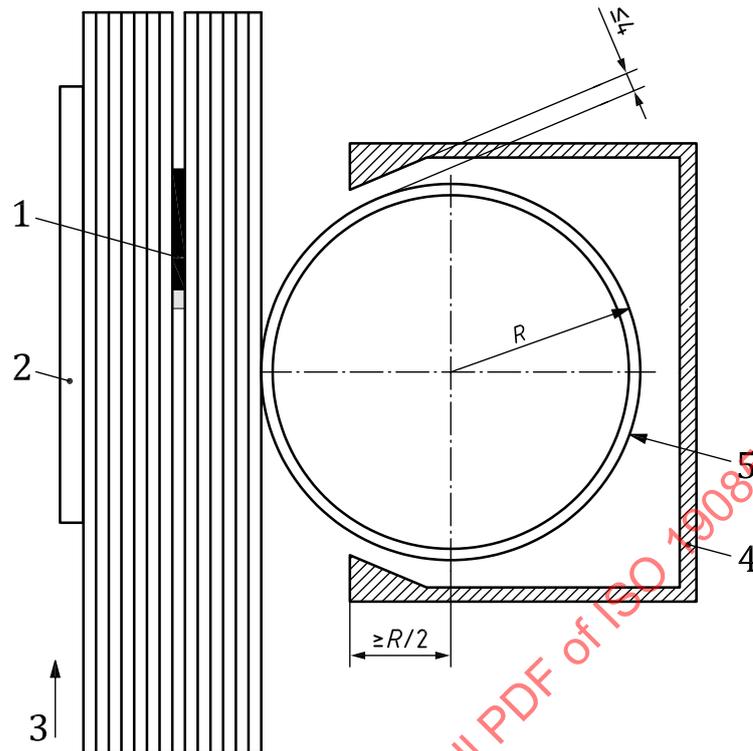
Verification: By checking relevant drawings, inspection of the machine and measurement.

5.10.2.4 Power operated workpiece feed

Band resaws shall be provided with a power operated workpiece feed, e.g. feed rollers, sliding table or chain conveyor. The feed system shall fulfil the following requirements.

- a) It shall keep the workpiece in contact with the workpiece support and the guiding system.
- b) It shall provide workpiece transport until the workpiece has passed the rear side of the band saw blade without closing of the saw kerf.
- c) Access to the feed rollers shall be impeded by a guard designed according to the dimension given in [Figure 10](#).
- d) A trip device in form of a trip bar shall be provided (see [Figure 2](#), key 9). The trip device shall fulfil the following requirements.
 - 1) It shall be interlocked with the feed drive.
 - 2) It shall be located in front of the feed rollers and above the workpiece support surface.
 - 3) The trip device shall be located not higher than 400 mm above the maximum cutting height of the machine.
 - 4) It shall extend over the whole width of the infeed opening and have a distance in feed direction of at least 250 mm to the infeed rollers.
 - 5) When tripped, the workpiece shall become stationary with a lag of maximum 100 mm.

Dimensions in millimetres

**Key**

1	band saw blade	4	guard
2	fence	5	feed roller
3	feed direction	R	radius of the feed roller

Figure 10 — Guarding of the feed roller on band resaws

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

5.11 Safety appliances

Subclause specific to this document.

For table band saws a push block handle shall be provided with a facility to store it on the infeed side of the machine.

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

6 Safety requirements and measures for protection against other hazards**6.1 Fire**

ISO 19085-1:2021, 6.1, applies.

6.2 Noise**6.2.1 Noise reduction at the design stage**

ISO 19085-1:2021, 6.2.1, applies.

6.2.2 Noise emission measurement and declaration

ISO 19085-1:2021, 6.2.2, applies with the following additions.

Annex F replaces ISO 19085-1:2021, Annex F.

6.3 Emission of chips and dust

ISO 19085-1:2021, 6.3, applies with the following additions.

For table band saws with wheel diameter greater than 500 mm the part of the band saw blade situated below the table shall be enclosed by a specific exhaust hood, which shall have an extraction outlet (see [Figure 11](#) for a recommended design of the exhaust hood).

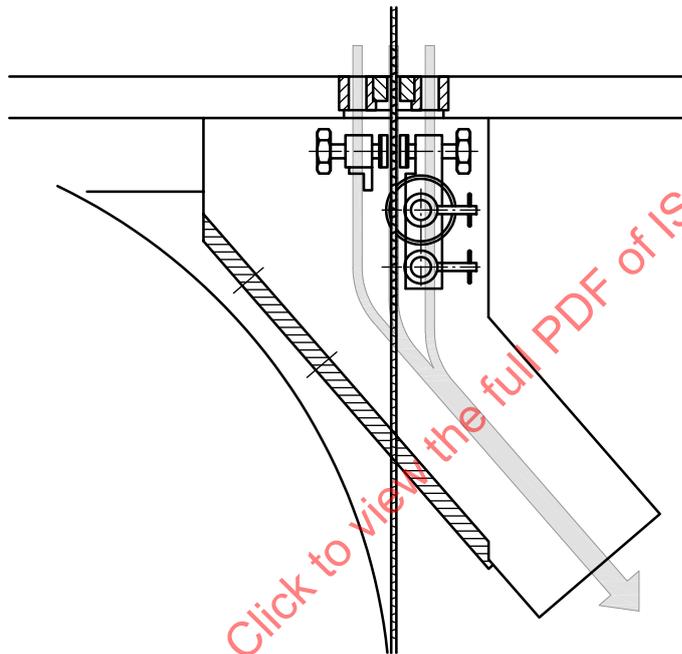


Figure 11 — Example of exhaust hood below the table

A proper chips and dust extraction can be obtained with the recommended air flow rates reported in [Table 2](#).

Table 2 — Relation between wheel diameter and air flow rate

Wheel diameter mm	Minimum airflow m ³ h ⁻¹
≤500	450
>500	700

6.4 Electricity

ISO 19085-1:2021, 6.4, applies.

6.5 Ergonomics and handling

ISO 19085-1:2021, 6.5, applies with the following additions.

The height of the workpiece support surface above floor level shall be between 850 mm and 1 100 mm for table band saws and between 850 mm and 1 200 mm for band resaws.

The holders for the safety appliances required in 5.11 shall be positioned so that the operator can reach the safety appliances from the normal working position.

6.6 Lighting

ISO 19085-1:2021, 6.6, applies.

6.7 Pneumatics

ISO 19085-1:2021, 6.7, applies.

6.8 Hydraulics

ISO 19085-1:2021, 6.8, applies.

6.9 Electromagnetic compatibility

ISO 19085-1:2021, 6.9, applies.

6.10 Laser

ISO 19085-1:2021, 6.10, applies.

6.11 Static electricity

ISO 19085-1:2021, 6.11, applies.

6.12 Errors of fitting

ISO 19085-1:2021, 6.12, does not apply.

6.13 Isolation

ISO 19085-1:2021, 6.13, applies.

6.14 Maintenance

ISO 19085-1:2021, 6.14, applies.

6.15 Relevant but not significant hazards

ISO 19085-1:2021, 6.15, applies.

7 Information for use

7.1 Warning devices

ISO 19085-1:2021, 7.1, applies.

7.2 Marking

7.2.1 General

ISO 19085-1:2021, 7.2.1, applies.

7.2.2 Additional markings

ISO 19085-1:2021, 7.2.2, applies with the following additions.

The following additional information shall be marked:

- a) on machines where the strain for the band saw blade is manually adjusted, the strain required for a given thickness and width of the band saw blade (see also [Figure 6](#));
- b) a scale designed and positioned so that the adjusted cutting width is indicated and easily legible.

7.3 Instruction handbook

7.3.1 General

ISO 19085-1:2021, 7.3.1, applies.

7.3.2 Additional information

ISO 19085-1:2021, 7.3.2, is replaced by the following text.

The following additional information shall also be provided in the instruction handbook, where relevant.

- a) Additional warnings regarding residual risk:
 - 1) a warning to never clean the band saw blade or band saw blade wheel of a band saw using a hand-held brush or scraper while the band saw blade is in motion;
 - 2) a warning to use suitable carrier equipment for transporting saw blades;
 - 3) a warning that in case of a broken band saw blade or a torn drive belt, if fitted, the wheels can keep running and that it is necessary to wait for the complete standstill of the machine before opening the guards.
- b) Additional instructions for safe operations:
 - 1) the principles of machine setting and operation, including the correct use and adjustment of workpiece holding and guiding devices and guards;
 - 2) to adjust the adjustable band saw blade guard so that it is as close to the workpiece as practicable;
 - 3) the safe handling of the workpiece when cutting;
 - 4) when replacing the table insert, to take care that the insert upper surface is levelled to the table;
 - 5) when the machine is not in use, for example at the end of a shift, release the band saw blade strain and place a notice on the machine to indicate this and to remind the next user to adjust the strain before starting up;
 - 6) care to be taken to avoid damaging the band saw blade. For example, when not in use, how un-tensioned band saw blades should be coiled and secured and stored in a safe, dry place. Before use, they should be checked for damaged teeth and cracks;
 - 7) to position the thrust wheel on a table band saw just clear of the back of the band saw blade when the band saw blade is running free after being strained and tracked. This is to avoid grooving of the thrust wheel, which can lead to band saw blade failure, and to give support to the band saw blade when cutting;
 - 8) to use a fence for straight cutting, to prevent the workpiece from rocking or sliding;

- 9) to use for shallow cut of flat workpieces the low part of a fence to allow the adjustable guard to be lowered;
 - 10) instructions on how to use the push block handle (see 5.11) when hand feeding along the fence;
 - 11) to use a demountable power feed device only when a socket for this purpose is provided and to connect the demountable power feed only with this socket;
 - 12) on machines with a fixed table, to provide a firm support for diagonal cutting by a means of jig when cutting diagonals and to use a push block at the end of the cut;
 - 13) instructions on a safe method for cross-cutting round or irregular shaped workpieces;
 - 14) instructions on a safe method for cutting tenons and wedges;
 - 15) instructions on a safe method for cutting curved workpieces, e.g. with a template;
 - 16) instructions on a safe method for cutting discs with a jig.
- c) Information regarding how to prepare the machine for displacement.
 - d) Information concerning the correct method of lifting the machine.

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Annex A (informative)

List of significant hazards

ISO 19085-1:2021, Annex A, is replaced by the following text.

[Table A.1](#) lists all significant hazards, hazardous situations and events (see ISO 12100:2010), identified by risk assessment as significant for table band saws and band resaws, and which require action to eliminate or reduce the risk.

Table A.1 — List of significant hazards

No.	Hazards, hazardous situations and hazardous events	ISO 12100:2010	Relevant subclause of this document
1	Mechanical hazards related to		
	— machine parts or workpieces due to		
	a) shape	6.2.2.1, 6.2.2.2, 6.3	4.2 , 5.3 , 5.6 , 5.10 , 7.2 , 7.3 , 6.15
	b) relative location		4.2 , 4.3 , 5.6 , 6.5 , 7.2
	c) mass and stability (potential energy of elements which can move under effect of gravity)		4.8 , 4.9 , 5.1
	d) mass and velocity (kinetic energy of elements in controlled or uncontrolled motion)		4.3 , 4.8 , 5.4 , 5.6 , 5.10
	e) mechanical strength		5.2 , 5.9
	— accumulation of energy inside the machinery due to		
	f) liquids and gases under pressure	6.2.10, 6.3.5.4	4.8 , 6.7 , 6.13
1.1	Crushing hazard		4.3 , 4.4 , 4.8 , 5.4 , 5.6 , 5.10 , 6.13
1.2	Shearing hazard		4.3 , 4.4 , 5.4 , 5.6 , 5.10 , 6.13
1.3	Cutting or severing hazard		4.3 , 4.4 , 4.5 , 4.8 , 5.3 , 5.4 , 5.6 , 6.13
1.4	Entanglement hazard		4.4 , 4.5 , 5.6 , 5.10 , 6.13
1.5	Drawing-in or trapping hazard		4.3 , 4.4 , 4.5 , 5.4 , 5.6 , 5.10 , 6.13
1.6	Impact hazard		4.3 , 5.10
1.9	High pressure fluid injection or ejection hazard		4.4 , 5.9 , 6.8 , 6.13
2	Electrical hazards due to		
2.1	Contact of persons with live parts (direct contact)	6.2.9, 6.3.5.4	6.4 , 6.13
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	6.2.9	6.4 , 6.13
2.4	Electrostatic phenomena	6.2.9	6.11
4	Hazards generated by noise , resulting in		

Table A.1 (continued)

No.	Hazards, hazardous situations and hazardous events	ISO 12100:2010	Relevant subclause of this document
4.1	Hearing loss (deafness), other physiological disorders (loss of balance, loss of awareness)	6.2.2.2, 6.3	6.2 , 7.1 , 7.3
4.2	Accidents due to interference with speech communication, acoustic signals		
6	Hazards generated by radiation		
6.5	Laser	6.3.4.5	6.10
7	Hazards generated by materials and substances (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	6.3 , 7.3
7.2	Fire hazard	6.2.4	6.1
8	Hazards generated by neglecting ergonomic principles 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	4.2 , 6.5
8.2	Hand-arm or foot-leg anatomy	6.2.8.3	6.5
8.4	Local lighting	6.2.8.6	6.6 , 7.3
8.5	Mental overload and underload, stress	6.2.8.5	7.3
8.6	Human error, human behaviour	6.2.8, 6.2.11.8, 6.2.11.10, 6.3.5.2, 6.4	7.3
8.7	Design, location or identification of manual controls	6.2.8 f), 6.2.11.8	4.2
8.8	Design or location of visual display units	6.2.8, 6.4.2	4.2
9	Combination of hazards		
		6.3.2.1	4.3 , 4.4 , 4.7 , 4.8 , 5.6 , 6.13 , 6.14
10	Unexpected start-up , unexpected overrun/overspeed (or any similar malfunction) from		
10.1	Failure/disorder of the control system	6.2.11, 6.3.5.4	4.1 , 6.13
10.2	Restoration of energy supply after an interruption	6.2.11.4	4.8 , 6.7
10.3	External influences on electrical equipment	6.2.11.11	4.1 , 6.9
10.4	Other external influences (gravity)	6.2.12.2	5.10
10.5	Errors in the software	6.2.11.7	4.1
10.6	Errors made by the operator (due to a 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	4.2 , 6.5 , 7.3
11	Impossibility of stopping the machine in the best possible conditions		
		6.2.11.1, 6.2.11.3, 6.3.5.2	4.4 , 4.5 , 6.13
12	Variation in the rotational speed of tools		
		6.2.2.2, 6.3.3	4.7
13	Failure of the power supply		
		6.2.11.1, 6.2.11.4	4.8
14	Failure of the control circuit		
		6.2.11, 6.3.5.4	4.1
16	Break-up during operation		
		6.2.3	5.2 , 5.9
17	Falling or ejected objects or fluids		
		6.2.3, 6.2.10	4.8 , 7.3
18	Loss of stability/overturning of machinery		
		6.3.2.6	5.1

Annex B (informative)

Performance level required

ISO 19085-1:2021, Annex B, is replaced by the following text.

[Table B.1](#) gives a quick-view summary of the performance level required (PL_r) for each safety function. However, refer to [Clauses 4](#) and [5](#) for full requirements.

Table B.1 — Safety functions and performance level required (PL_r)

Area	Safety function		PL _r	Relevant subclause of ISO 19085-1:2021	Relevant subclause of this document
Start	1	Prevention of unexpected start	c	4.3.1	
	2	Interlocking of start with safeguards	c	4.3.1	
	3	Interlocking of powered feed with tool rotation	c	4.3.1	
	4	Prevention of unexpected control power-on	c	4.3.2	
	5	Interlocking of control power-on with safeguards	c	4.3.2	
Stop	7	Normal stop (braking function excluded)	c	4.4.2	
	8	Emergency stop (braking function excluded)	c	4.4.4	
Tool braking	9	Activation of the brakes	c	4.5	
	10	Electric braking system	b	4.5	
	11	SS1 of PDS(SR)	c	4.5	
	12	Interlocking of brake release	c	5.4.3	
Mode selection	13	Mode selection	c	4.6	
	14	Overriding of the tool drive brake	c		4.6
	15	Run time limitation	c		4.6
Spindle speed	16	Speed indication	b	4.7.1	
	17	Speed selection	c	4.7.2	
	18	Speed monitoring	c	4.7.3	
Controls	19	Standstill detection and monitoring	c	4.10	
	20	Speed monitoring of moving parts (except tools)	b	4.11	
	21	Time delay	c	4.12	
Safeguards	22	Interlocking of movable guards	c	5.5.2.2, 5.5.2.3	
	23	Guard locking of movable guards	c	5.5.2.3	
	24	Interlocking of dangerous movements with PSPE	c	5.5.6	

Annex C
(normative)

Stability test

ISO 19085-1:2021, Annex C, applies.

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