
Woodworking machines — Safety —
Part 8:
Belt sanding and calibrating machines
for straight workpieces

Machines à bois — Sécurité —

Partie 8: Machines de ponçage et de calibrage à bande pour pièces droites

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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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 on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 39, *Machine tools*, Subcommittee SC 4, *Woodworking machines*.

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, 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 document can either

- confirm as a whole,
- confirm with additions,
- exclude in total, or
- replace with specific text

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 document without correspondent in 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 847-1:2013.

Woodworking machines — Safety —

Part 8: Belt sanding and calibrating machines for straight workpieces

1 Scope

This document gives the safety requirements and measures for stationary calibrating and sanding machines, with an integrated feed and one or more sanding belt units positioned above and/or below the work piece level, with manual or automatic loading and/or unloading hereinafter referred to as “machines”.

It deals with all significant hazards, hazardous situations and events as listed in [Clause 4](#), relevant to the machines, when 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 have been taken into account.

NOTE 1 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/additional working units, whose hazards have been dealt with:

- transversal sanding unit;
- cleaning brushing unit;
- satining roller unit;
- disk brushing unit;
- texturing brushing roller unit;
- texturing brushing belt unit;
- cutterblock unit;
- texturing band saw unit;
- spiked roller unit;
- antistatic bars;
- conveyor directly controlled by the machine;
- additional work piece vacuum clamping device.

The machines are designed to calibrate and/or sand work pieces, in shape of panels or beams, consisting of:

- a) solid wood;
- b) material with similar physical characteristics to wood (see ISO 19085-1:2017, 3.2);
- c) gypsum boards, gypsum bounded fibreboards;
- d) composite materials with core consisting of e.g. polyurethane or mineral material;

- e) composite boards made from the materials listed above;
- f) all materials listed above, also already lacquered.

This document does not deal with hazards related to:

- specific devices other than those listed above;
- access through in-feed and out-feed openings of machines with a work piece height capacity greater than 550 mm;
- systems for automatic loading and/or unloading of the work piece to/from a single machine;

NOTE 2 Loading the machine manually includes manually placing the work piece onto a conveyor directly controlled by the machine. Unloading the machine manually includes manually removing the work piece from a conveyor directly controlled by the machine.

- interfacing of the machine with any other machine.

It is not applicable to machines intended for use in potentially explosive atmosphere and 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 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 19085-1:2017, *Woodworking machines — Safety — Part 1: Common requirements*

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*

EN 847-1:2013, *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 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 calibrating and sanding machine

machine used to calibrate and/or to sand panels and/or linear work pieces, fitted with an integrated feed and sanding belts positioned above and/or below the work piece level, with manual or automatic loading and/or unloading

Note 1 to entry: See [Figures 1](#) and [2](#) for examples of different machine designs (safeguarding devices are not illustrated).

Note 2 to entry: sanding belts can rotate in both directions, against the feed or in “climb cutting”. The definitions of these directions of rotation are given in ISO 19085-1:2017, 3.16 and 3.17.

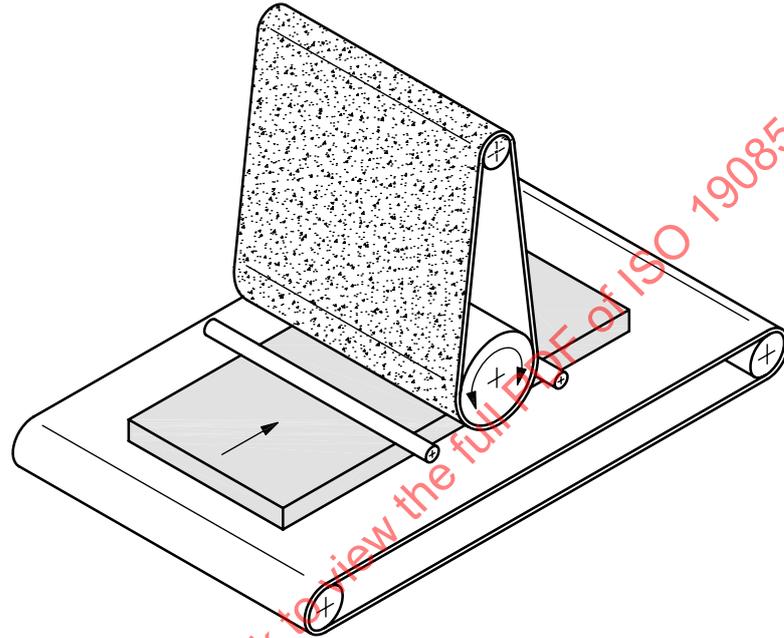


Figure 1 — Example of sanding belt unit positioned above the work piece level

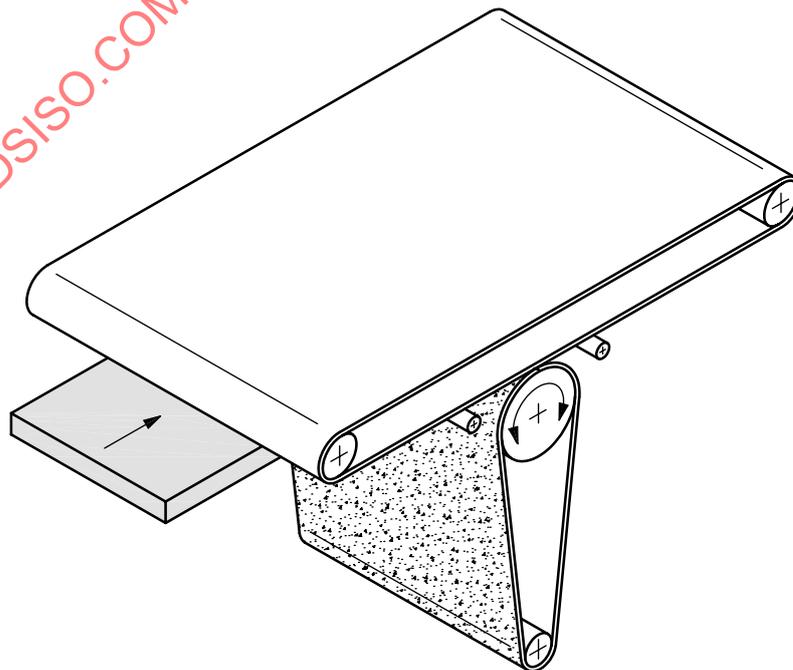


Figure 2 — Example of sanding belt unit positioned below the work piece level

3.2 transversal sanding unit

unit with sanding belt working perpendicularly to the panel feed direction positioned above or below the work piece level

Note 1 to entry: See [Figure 3](#) (safeguarding devices are not illustrated).

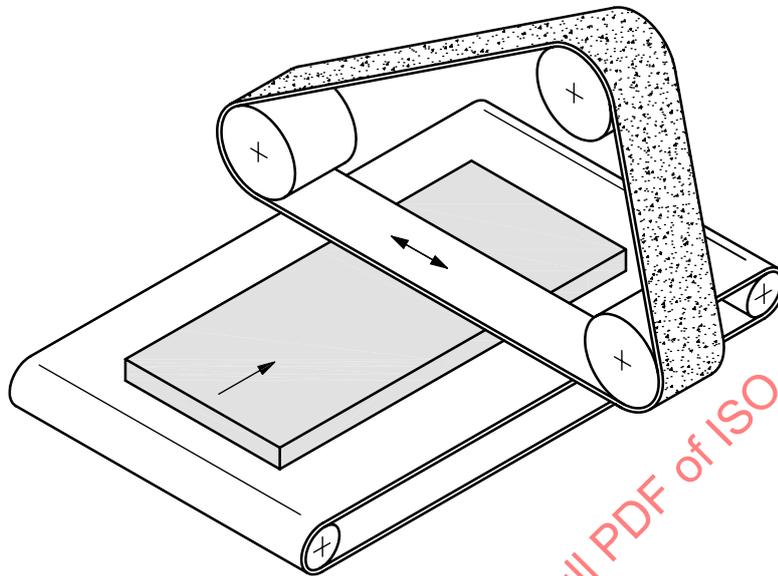


Figure 3 — Example of transversal sanding unit

3.3 cleaning brushing unit

unit with either brushing roller or brushing belt, both bearing non-abrasive brushes, positioned above or below the work piece level

3.4 satining roller unit

unit with satining roller positioned above or below the work piece level and working in parallel to the work piece feed direction

Note 1 to entry: Satining roller unit rotation can be in both directions, against the feed or in “climb cutting”.

3.5 disk brushing unit

unit with rotating abrasive disks positioned above or below the work piece level

Note 1 to entry: See [Figure 4](#) (safeguarding devices are not illustrated).

3.6 texturing brushing roller unit

unit with abrasive brushing roller positioned above or below the work piece level and working in parallel to the work piece feed direction

Note 1 to entry: Texturing brushing roller unit rotation can be in both directions, against the feed or in “climb cutting”.

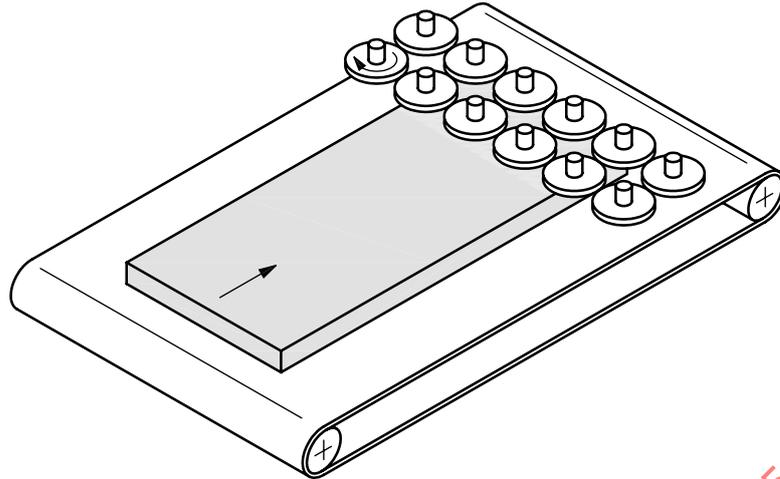


Figure 4 — Example of disk brushing unit

3.7

texturing brushing belt unit

unit with abrasive brushes mounted on a belt positioned above or below the work piece level and working perpendicularly to the work piece feed direction

Note 1 to entry: See [Figure 5](#) (safeguarding devices are not illustrated).

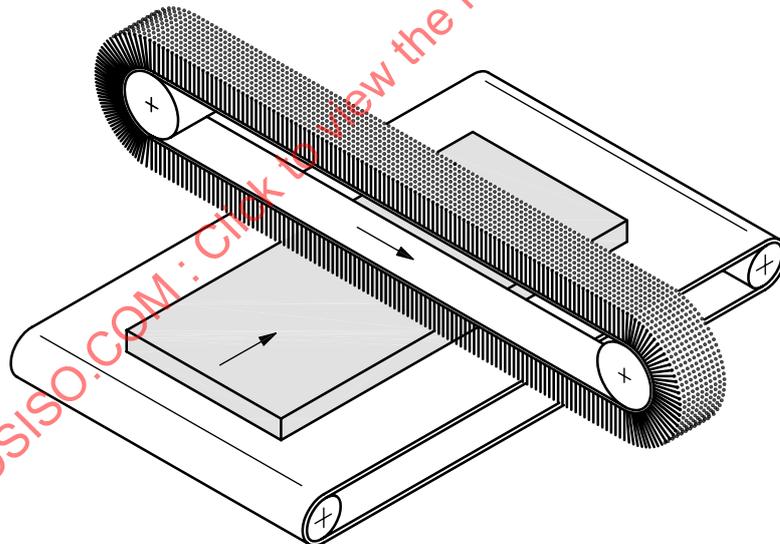


Figure 5 — Example of texturing brushing belt unit

3.8

texturing band saw unit

unit with a band saw for texturing panel surface positioned above or below the work piece level and working perpendicularly to the work piece feed direction

Note 1 to entry: See [Figure 6](#) (safeguarding devices are not illustrated).

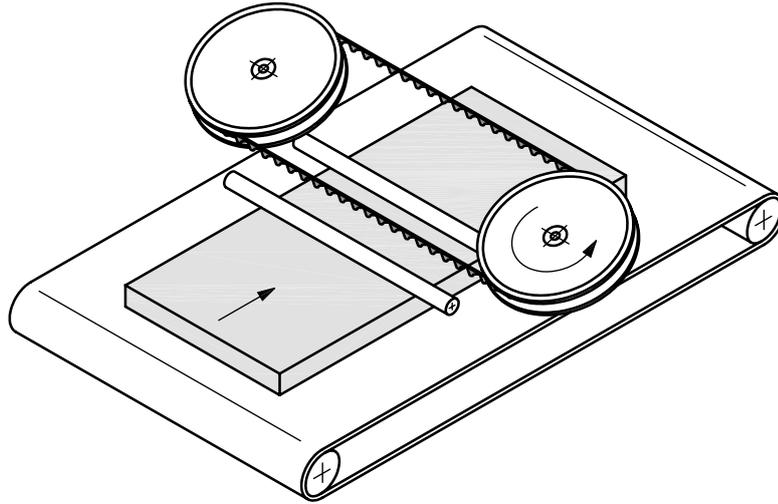


Figure 6 — Example of texturing band saw unit

**3.9
cutterblock unit**

unit with cylindrical-shaped complex tool equipped with blades or inserts with a straight, helical or V-shaped cutting line, positioned above or below the work piece level and working in parallel to the work piece feed direction and against the feed

Note 1 to entry: See [Figure 7](#) (safeguarding devices are not illustrated) and EN 847-1 for a description of a complex tool.

Note 2 to entry: During rotation, cutterblock can also have a reciprocating movement along its axis and in vertical direction.

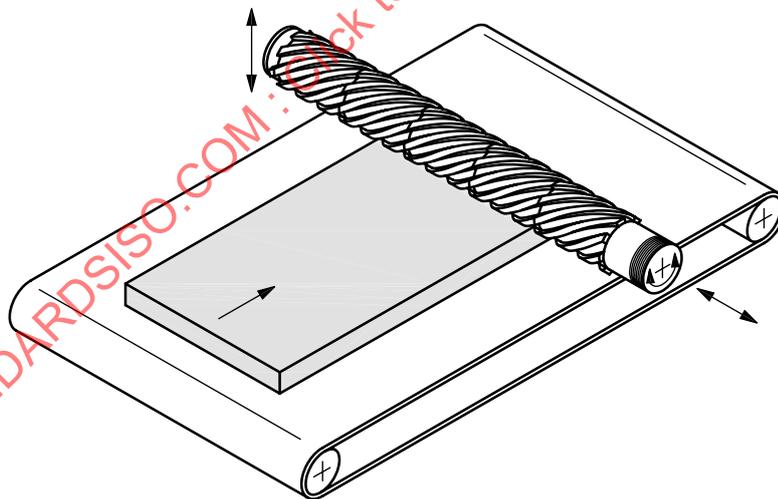


Figure 7 — Example of cutterblock unit

**3.10
spiked roller unit**

unit with spiked roller for creating a woodworm effect on the work piece surface positioned above or below the work piece level and working in parallel to the work piece feed direction and in climb cutting

Note 1 to entry: See [Figure 8](#) (safeguarding devices are not illustrated).

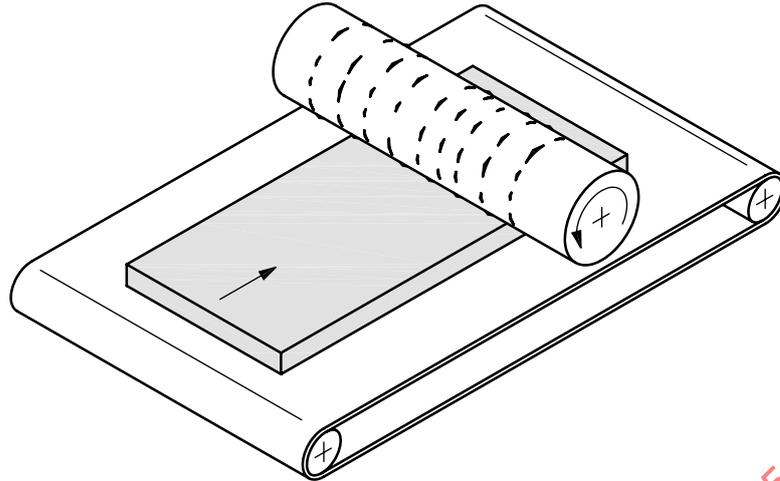


Figure 8 — Example of spiked roller unit

3.11

antistatic bar

ionizing bar and/or carbon fibres bar used to eliminate electrostatic charges

3.12

processing unit rest position

position of the processing unit when not in contact with the work piece

3.13

control power-on

control which, after actuation, enables the provision of power to machine actuators that can also be on a lower control level, by means of, for example, PLC

4 List of significant hazards

This clause contains all significant hazards, hazardous situations and events (see ISO 12100), identified by risk assessment as significant for the machines as defined in the Scope 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 clause of ISO 19085-8:2017
1	Mechanical hazards related to		
	– Machine parts or work pieces due to		
	a) shape		6.3 , 6.9.2 , 6.6 , 6.10
	b) relative location		5.2 , 5.4.4 , 6.9.2 , 6.10 , 6.6
	c) mass and stability (potential energy of elements which may move under the effect of gravity)		6.1 , 6.6 , 6.10
	d) mass and velocity (kinetic energy of elements in controlled or uncontrolled motion)	6.2.2.1, 6.2.2.2, 6.3	5.3 , 6.6
	e) mechanical strength		6.2 , 6.3 , 6.9.2 , 6.10 , 6.6 , 6.6.2.3 , 6.9.1.3 , Annex F , Annex G , Annex B

Table 1 (continued)

No.	Hazards, hazardous situations and hazardous events	ISO 12100:2010	Relevant clause of ISO 19085-8:2017
	– Accumulation of energy inside the machinery due to		
	f) elastic elements (springs);	6.2.10, 6.3.5.4	6.6 , 6.10 , 7.5
	g) liquids and gases under pressure;		7.7 , 7.8
1.1	Crushing hazard		6.6
1.2	Shearing hazard		6.6
1.3	Cutting or severing hazard		6.3 , 6.6
1.4	Entanglement hazard		6.6
1.5	Drawing-in or trapping hazard		6.6
1.6	Impact hazard		6.10
1.9	High pressure fluid injection or ejection hazard	6.2.10	7.8
2	Electrical hazards due to		
2.1	Contact of persons with live parts (direct contact)	6.2.9, 6.3.5.4	7.4
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	6.2.9	7.4
4	Hazards generated by noise , resulting in		
4.1	Hearing loss (deafness), other physiological disorders (loss of balance, loss of awareness)	6.2.2.2, 6.3	7.2
4.2	Interference with speech communication, acoustic signals		7.2
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	7.3
7.2	Fire	6.2.4	7.1
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	5.2 , 7.5 , 8.3
8.2	Hand-arm or foot-leg anatomy	6.2.8.3	5.2 , 6.6 , 7.5
8.4	Local lighting	6.2.8.6	8.3
8.6	Human error, human behaviour	6.2.8, 6.2.11.8, 6.2.11.10, 6.3.5.2, 6.4	8.3
8.7	Design, location or identification of manual controls	6.2.8 f), 6.2.11.8	5.2
8.8	Design or location of visual display units	6.2.8, 6.4.2	7.5 , 7.13 , 8.1 , 8.2
9	Combination of hazards	6.3.2.1	5.3 , 5.4.4 , 5.9 , 5.10 , 6.9.2 , 7.13 , 7.11
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	5.1 , 5.2 , 5.3 , 5.4.2 , 5.4.4 , 5.9 , 5.10
10.2	Restoration of energy supply after an interruption	6.2.11.4	5.9
10.3	External influences on electrical equipment	6.2.11.11	5.1 , 7.9
10.5	Errors in the software	6.2.11.7	5.1
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	7.5 , 7.11 , 8.3

Table 1 (continued)

No.	Hazards, hazardous situations and hazardous events	ISO 12100:2010	Relevant clause of ISO 19085-8:2017
11	Impossibility of stopping the machine in the best possible conditions	6.2.11.1, 6.2.11.3, 6.3.5.2	5.4.2 , 5.4.4 , 6.4
13	Failure of the power supply	6.2.11.1, 6.2.11.4	5.9
14	Failure of the control circuit	6.2.11, 6.3.5.4	5.1 , 5.10 , 6.4
15	Errors of fitting	6.2.7, 6.4.5	8.2
16	Break-up during operation	6.2.3	6.2 , 6.6.2.3, 6.9.1.3, Annex E , Annex G
17	Falling or ejected objects or fluids	6.2.3, 6.2.10	6.2 , 6.3 , 6.9.2
18	Loss of stability/overturning of machinery	6.3.2.6	6.1

5 Safety requirements and measures for controls

5.1 Safety and reliability of control systems

This subclause of ISO 19085-1:2017 applies.

5.2 Control devices

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

Emergency stop controls shall be fitted at the following locations:

- a) at the main control panel;
- b) on manual loaded machines, at the loading position on the machine front side, at least at one lateral side;
- c) on manual unloaded machines, at the unloading position on the machine rear side, at a horizontal distance of less than 600 mm from the opening edges;
- d) adjacent to each hold-to-run control device.

If, in fulfilment of the above requirements, the distance between two separate emergency-stop devices results to be less than 1 m, one device is sufficient and its position can be chosen.

5.3 Start

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

A control power-on button shall be provided and protected against unintended actuation, e.g. by shroud.

Control power-on activation in automatic mode shall only be possible when all safeguards are in place and functional. This is achieved by the interlocking arrangements described in [6.6](#).

Process start or restart shall only be possible after control power-on activation and need not to achieve a PL.

The cutterblock unit shall not leave its rest position towards the work piece if the cutterblock is not rotating.

Closure of interlocking movable guards shall not lead to an automatic restart of hazardous movements.

The SRP/CS for control power-on and for interlocking of control power-on with safeguards shall achieve $PL_r = c$.

ISO 19085-8:2017(E)

The SRP/CS for interlocking of the cutterblock rotation with the rest position of the cutterblock unit shall achieve $PL_r = b$.

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 with the following additions.

Machine actuators to be stopped are all except those for movements smaller than 3 mm of any processing unit, i.e. adjustments and switch between operating and rest positions.

When the stop function is actuated, the processing units shall retract to their rest position.

5.4.2 Normal stop

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

For machine actuators to be stopped, see [5.4.1](#).

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.

5.6 Mode selection

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

The following requirement applies, in addition to those in ISO 19085-1:2017, 5.6 a) to c):

d) the mode selection switch shall be located outside the hazards zone e.g. on the machine control panel.

A setting mode shall be provided for adjustments of processing units while the guards according to [6.6.2](#) are open, fulfilling the following requirements:

- 1) selecting the setting mode shall stop the feed and all processing units;
- 2) all processing units other than cutterblock, band saw and spiked roller units may run and be switched between operating and rest position under hold-to-run control, one at a time. The hold-to-run control device shall be positioned near the units or on a mobile control, in sight of the selected unit. More than one hold-to-run control device might be necessary. The SRP/CS for the selection of the processing unit shall achieve $PL_r = b$.

5.7 Spindle speed changing

5.7.1 Spindle speed changing by changing belts on the pulleys

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

5.7.2 Spindle speed changing by incremental speed change motor

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

On machines with an incremental speed change motor, e.g. a change pole motor, the selected speed shall be indicated.

The SRP/CS for indication of selected speed shall achieve $PL_r = b$.

The SRP/CS for cutterblock unit speed selection 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.

5.7.3 Infinitely variable speed frequency inverter

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

Requirements on speed monitoring stated in ISO 19085-1:2017 apply to the maximum rotational speed set by the machine manufacturer for the cutterblock. This speed shall be indicated in a label close to the cutterblock [see 8.2.2 b) and 8.3.2 i)].

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 applies with the following additions.

Manual reset may be achieved by control power-on circuit.

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 specific 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 limited 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 $PL_r = b$.

5.12 Time delay

This subclause of ISO 19085-1:2017 applies.

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 is replaced by the following text.

It shall be possible to fix stationary machines to a suitable stable structure, e.g. floor. Facilities for fixing are, e.g. fixing holes in the machine frame [also see 8.3.1 g)].

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

6.1.2 Displaceable machines

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

6.2 Risk of break-up during operation

This subclause of ISO 19085-1:2017 applies.

6.3 Tool holder and tool design

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

The cutterblock shall be of a round form complex cylindrical type in accordance with EN 847-1:2013.

NOTE Both types of cutterblock marked MEC or MAN are suitable.

Loosening of the cutterblock and of the band saw blade during start up, running, run-down and braking shall be prevented.

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

6.4 Braking

6.4.1 Braking of tool spindles

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

Braking requirements apply also to sanding units and any other processing unit except cleaning brushing units and sanding unit.

6.4.2 Maximum run-down time

This subclause of ISO 19085-1:2017 applies.

6.4.3 Brake release

This subclause of ISO 19085-1:2017 applies.

6.5 Safeguards

6.5.1 Fixed guards

This subclause of ISO 19085-1:2017 applies.

6.5.2 Interlocking moveable guards

6.5.2.1 General

This subclause of ISO 19085-1:2017 applies.

6.5.2.2 Moveable guards with interlocking without guard locking

This subclause of ISO 19085-1:2017 applies.

6.5.2.3 Moveable guards with interlocking and guard locking

This subclause of ISO 19085-1:2017 applies.

6.5.3 Hold-to-run control

This subclause of ISO 19085-1:2017 applies.

6.5.4 Two-hand control

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

6.5.5 Electro-sensitive protective equipment (ESPE)

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

6.5.6 Pressure sensitive protecting device (PSPE)

This subclause of ISO 19085-1:2017 applies.

6.6 Prevention of access to moving parts

6.6.1 General

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

ESPE are not relevant.

6.6.2 Guarding of tools

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

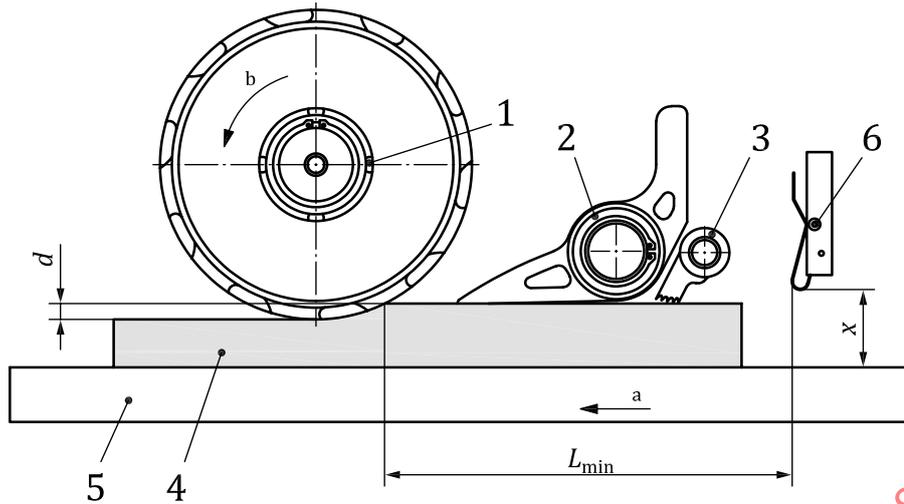
Access to any running processing unit shall be prevented by means of fixed guards, other than through the in-feed and out-feed opening.

Where access is provided for maintenance, adjustment or setting, this access shall be via movable guards with interlocking, or with interlocking and guard locking if the rundown time is more than 2 s, that shall stop any dangerous movement.

The distance L_{min} between the cutterblock and the in-feed opening of the machine enclosure shall be (see [Figure 9](#)):

- a) $L_{min} \geq 200 \text{ mm}$ for in-feed opening heights of $X \leq 160 \text{ mm}$;
- b) $L_{min} \geq 1,25 X$ for in-feed opening heights of $X > 160 \text{ mm}$.

X shall be calculated or measured with the machine set at the maximum work height capacity and at the maximum cutterblock cutting depth.



Key

- | | | | |
|----------|-----------------------------------|----------|------------------------|
| <i>d</i> | maximum cutterblock cutting depth | 4 | work piece |
| <i>X</i> | maximum work height capacity | 5 | work piece support |
| 1 | cutterblock | 6 | trip device |
| 2 | pressure device | <i>a</i> | Feed direction. |
| 3 | anti-kickback fingers | <i>b</i> | Direction of rotation. |

Figure 9 — In-feed opening – minimum distance to cutterblock

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

6.6.3 Guarding of drives

This subclause of ISO 19085-1:2017 applies.

6.6.4 Guarding of shearing and/or crushing zones

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

Access to feed belt drawing-in points shall be prevented by fixed guards.

Information related to residual risks at the in-feed and out-feed openings of the machine shall be provided in the instruction handbook [see 8.3.2 b) 1)].

Access to the hazard points at the in-feed opening of the machine shall be prevented by a mechanically actuated trip device, which shall meet the following requirements:

- a) the width of the trip device sensor shall be at least equal to the width of the in-feed opening;
- b) actuation of the trip device shall stop the feed belt and retract the processing units to their rest position;
- c) in the rest position, the gap between the bottom of the trip device and the work piece surface shall not be more than 8 mm for any work piece thickness;
- d) the tripping force shall be less than or equal to 50 N;
- e) with regard to the gap between the trip sensor and the work piece, the horizontal distance from the trip sensor to the hazard point, the response time of the trip device and the stopping time of the feed, the trip sensor shall be designed and positioned so that the front end of a test wedge, resting on the work piece moving at the maximum feed speed against the trip, shall not reach the hazard

point and shall still be able to be retracted (not clamped). The test wedge shall be made of solid wood, be 200 mm long, 100 mm wide, 12 mm high at the front end and 40 mm at the rear end;

f) a manual reset shall be provided to enable the restart of the feed.

The SRP/CS for the interlocking of the work piece feed with the trip device shall achieve $PL_r = c$.

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

6.7 Impact hazard

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

For manual unloading, a feed speed limit of 35 m/min applies. If the out-feed height of the work piece support is higher than 1 200 mm above the floor level, the feed speed limit shall be 25 m/min.

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

6.8 Clamping devices

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

A pressure roller or a pressure pad shall be provided in between processing units, before the first and after the last processing unit.

As an exception, work piece clamping may be ensured by vacuum alone only for cleaning brushing units.

During operation, the relevant pressure devices (rollers or pads) shall be in clamping position before any processing unit can come in contact with the work piece.

The SRP/CS for the interlocking of the pressure devices clamping position with the relevant processing unit position shall achieve $PL_r = c$.

The SRP/CS for the interlocking of the work piece vacuum clamping, when clamping is ensured by vacuum alone, with the relevant processing unit position shall achieve $PL_r = b$.

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

6.9 Measures against ejection

6.9.1 General

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

Anti-splinter devices are not relevant.

Where the last processing unit is a sanding or a texturing brushing or a satining roller unit and operates in climb cutting, the pressure device after it, if only one is fitted, shall be a pressure roller. A pressure pad alone is not allowed in this case.

6.9.2 Guards material and characteristics

6.9.2.1 Choice of class of guards

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

Guards used to prevent direct ejection of parts from any processing unit except cutterblock and cleaning brushing unit shall be of class B according to [6.9.2.3](#).

Guards used to prevent direct ejection of parts from cutterblock units shall be of class A according to [6.9.2.2](#).

6.9.2.2 Guards of class A

This subclause of ISO 19085-1:2017 applies.

6.9.2.3 Guards of class B

This subclause of ISO 19085-1:2017 applies.

6.9.3 Anti-kickback devices

Subclause specific to this part of ISO 19085.

6.9.3.1 Anti-kickback devices for machines without cutterblock

Machines without cutterblock unit shall be fitted with an anti-kickback device covering the full working width of the machine and passing the kickback test in [Annex F](#).

Verification: By checking the relevant drawings, inspection of the machine, measurement, functional testing of the machine and the test in [Annex F](#) shall be performed.

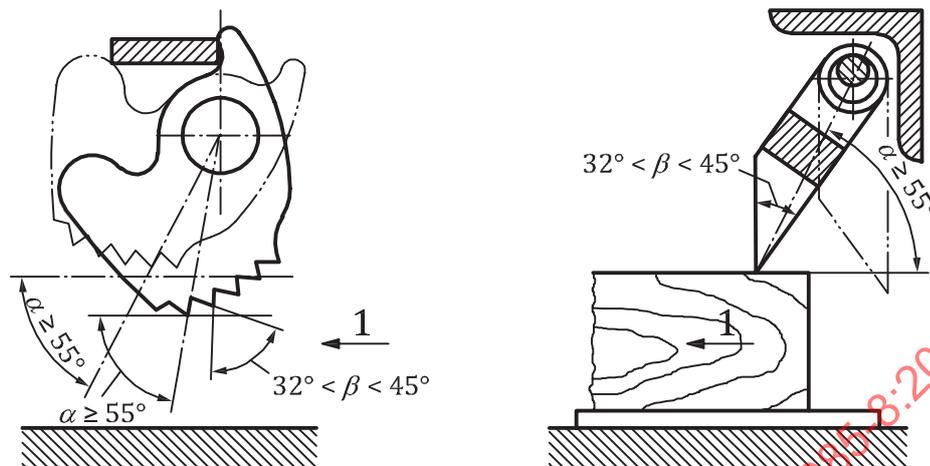
6.9.3.2 Anti-kickback devices for machines with cutterblock

Machines provided with cutterblock unit shall be fitted with an anti-kickback device consisting of separately moveable fingers over the full working width of the machine.

The anti-kickback device and its fingers shall be designed, manufactured and set according to the following requirements:

- a) they shall be located before the first pressure device at the in-feed (see [Figure 9](#)) and be effective against the work piece support;
- b) the fingers shall have a resilience of at least 15 J cm^{-2} and a superficial hardness of at least 100 HB;
- c) the fingers' thickness shall be between 8 mm and 15 mm for machines with a useable working width equal to or more than 260 mm, and between 3 mm and 8 mm for machines with a useable working width less than 260 mm;
- d) the tip radius of the fingers shall not exceed 0,3 mm;
- e) the angle α shall conform to the values given in [Figure 10](#) for any cutting depth for which the machine is designed, the angle β shall be more than 32° and less than 45° ;
- f) the space in between fingers shall not be wider than half the width of the fingers;
- g) the total lateral movement of the anti-kickback fingers that can move freely shall not exceed 1 % of the machine's useable working width;
- h) fingers shall fall under their own weight to their rest position. Mechanical end stops shall be provided, preventing their rotation around the shaft except for an angular sector corresponding to the minimum and maximum thickness capacity;
- i) in rest position of the fingers, their tips shall be at least 2 mm below the horizontal tangent to the cutting circle outside diameter, when the relevant cutterblock unit is positioned above the work piece, and at least 2 mm above the horizontal tangent to the cutting circle outside diameter when relevant cutterblock unit is positioned below the work piece;

j) they shall pass the kickback test in [Annex G](#).



Key

1 feed direction

Figure 10 — Anti-kickback fingers

Verification: By checking the relevant drawings, inspection of the machine, measurement, functional testing of the machine and the test in [Annex G](#) shall be performed.

6.9.4 Adjustment of machine work height

Subclause specific to this part of ISO 19085.

In machines where processing units are located under the work piece, the following requirements apply:

- a) for machines where work height adjustment is by hand wheel or power operated under hold-to-run control, instructions shall be given as per [8.3.2 h](#)).
- b) for machines where work height adjustment is under NC or CNC-control, opening movement while the processing units are running shall only be possible either:
 - 1) by providing a means of detecting that any work piece that has passed the in-feed opening of the machine has passed the processing units. The SRP/CS for this detection system shall achieve $PL_R = b$; or
 - 2) if the processing units are in their rest position. The SRP/CS for the interlocking of the work height opening movement with the processing units' position shall achieve $PL_R = b$.

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

6.10 Work piece support and guides

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

The work piece support shall fulfil the following requirements:

- a) it shall be lockable in position during processing unless its movement is self-locking;
- b) an over-thickness protection device shall be provided to limit the depth of cut, located at the in-feed side of the machine, interlocked with the work piece feed. The SRP/CS for the interlocking of the over-thickness protection device with the feed shall achieve $PL_R = b$.

When a cutterblock unit is provided, the following additional requirements shall be fulfilled:

- c) an electro-mechanical or a mechanical end stop shall be provided to prevent contact between the work piece support and the anti-kickback device or the cutterblock in any position. The SRP/CS for this interlocking shall achieve $PL_r = c$.

On machines fitted with a roller table at the out-feed end, the gaps between the rollers shall be closed by fixed guards. The gaps between the rollers and the fixed guards and between the first roller and the end of the machine shall be smaller than or equal to 4 mm (see [Figure 11](#)). The fixed guards between the rollers shall have a maximum depth below the top of the rollers of 15 mm (see [Figure 11](#)).

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

Dimensions in millimetres

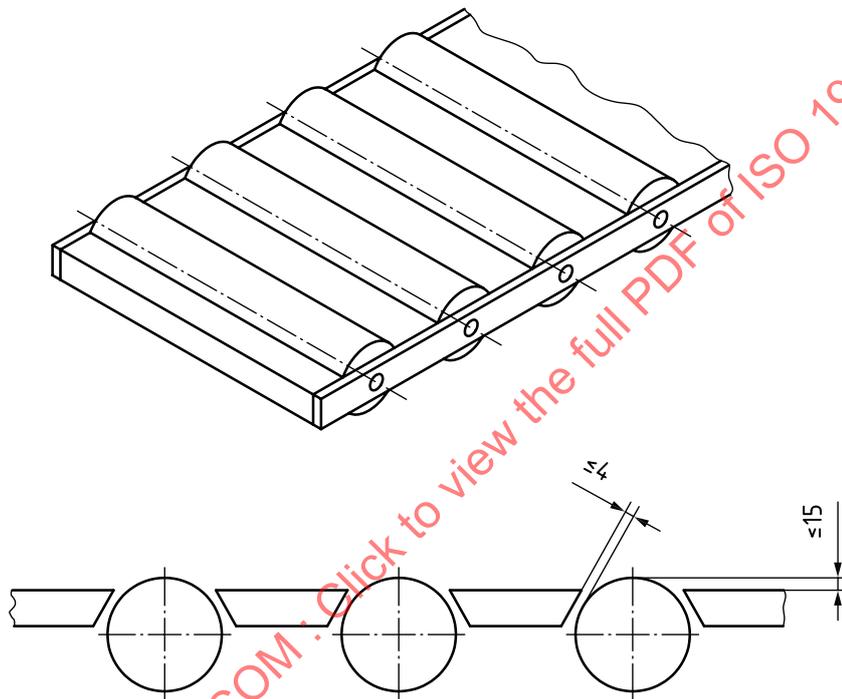


Figure 11 — Roller table - safeguarding of gaps between the rollers

7 Safety requirements and measures for protection against other hazards

7.1 Fire

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

On machines provided with a cutterblock unit, the requirements in [6.10](#) apply for avoiding sparks as result of contact between cutting knives and the table lips.

7.2 Noise

7.2.1 Noise reduction at the design stage

This subclause of ISO 19085-1:2017 applies.

7.2.2 Noise emission measurement

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

The operating conditions for noise measurement shall comply with ISO 7960:1995, Annex R. In addition, when a cutterblock unit is provided, ISO 7960:1995, Annex C applies.

NOTE In any case, the noise level using any unit is lower than the noise level of sanding units, with the exception of cutterblock.

7.3 Emission of chips and dust

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

Provision shall be made for extraction of chips and dust from each processing unit of the machine.

For cutterblock units, the recommended airflow rate should be 2 000 m³/h per meter of machine width capacity.

For all units except the cutterblock unit, the recommended airflow rate at each processing unit should be 1 600 m³/h per meter of machine width capacity.

7.4 Electricity

7.4.1 General

This subclause of ISO 19085-1:2017 applies.

7.4.2 Displaceable machines

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

7.5 Ergonomics and handling

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

The machine shall be fitted with a scale or a digital display for indicating the work piece thickness to be processed. This scale shall be so designed and positioned that the adjusted work piece thickness is indicated directly and easily legible, e.g. by fitting a magnifying glass.

On machines with manual loading/unloading, the height of the work piece support shall be between 750 mm and 1 050 mm above the floor level.

Handles, levers and latches or mechanically adjustable units shall be reachable from the operator's position.

7.6 Lighting

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

7.7 Pneumatics

This subclause of ISO 19085-1:2017 applies.

7.8 Hydraulics

This subclause of ISO 19085-1:2017 applies.

7.9 Electromagnetic compatibility

This subclause of ISO 19085-1:2017 applies.

7.10 Laser

This subclause of ISO 19085-1:2017 applies.

7.11 Static electricity

This subclause of ISO 19085-1:2017 applies.

7.12 Errors of fitting

This subclause of ISO 19085-1:2017 applies.

7.13 Isolation

This subclause of ISO 19085-1:2017 applies.

7.14 Maintenance

This subclause of ISO 19085-1:2017 applies.

8 Information for use

8.1 Warning devices

This subclause of ISO 19085-1:2017 applies.

8.2 Markings

8.2.1 General

This subclause of ISO 19085-1:2017 applies.

8.2.2 Additional markings

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

The following additional information shall be marked in the same ways:

- a) arrows for indication of direction of rotation shall be provided in each processing unit;
- b) for cutterblock requiring speed monitoring according to [5.7.3](#), a label, positioned close to the cutterblock, stating the value of the maximum rotational speed set by the machine manufacturer for this cutterblock, and a label stating to check the instruction handbook.

For marking of the cutterblock, the requirements of EN 847-1:2013 apply.

8.3 Instruction handbook

8.3.1 General

This subclause of ISO 19085-1:2017 applies.

8.3.2 Additional information

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

The following additional information shall also be provided in the instruction handbook:

- a) information that reasonably foreseeable misuse also includes the following activities, and warnings to refrain from these activities:
 - 1) feeding work pieces of different thickness or overlapping at the same time, as this can cause the work pieces to be ejected from the machine, e.g. by kickback;
 - 2) trying to manually unload a work piece already engaged by the feeding system;
- b) warning regarding residual risk shall also include:
 - 1) contact with any processing unit from in-feed and out-feed openings;
 - 2) processing of work pieces with cut-outs, e.g. window frames. These work pieces cause a shearing hazard with the front edge of the in-feed table;
- c) instruction for safe handling of work piece during machining;
- d) instructions about safety devices tests, method and frequency shall also include:
 - 1) anti-kickback device – by functional test;
 - 2) anti-kickback fingers mounted in combination with cutterblock unit – by inspection at least once every working shift that they are in good working condition, e.g. the contact face for impact damage and that the fingers fall freely under their own weight;
- e) information that before changing the cutterblock, the machine shall be isolated;
- f) information that the maximum length of the work pieces to be processed shall not exceed the minimum space at the out-feed end of the machine minus 500 mm;
- g) information that only cutterblocks conforming to EN 847-1:2013 marked MEC or MAN shall be used;
- h) in machines where processing units are positioned under the work piece support, information that increasing of machine work height, when operated by hand-wheel or power-operated under hold-to-run, is only permissible after checking that no work piece is inside the machine or all operating units positioned under the work piece support are in their rest position or not running [see 5.15 a)];
- i) instruction for safe use shall include also information to use only cutterblocks rated for a rotational speed equal to or higher than the maximum rotational speed of the cutterblock indicated by the related label [see [8.2.2 b\)](#)].

Annex A (informative)

Performance level required

This annex replaces ISO 19085-1:2017, Annex A and gives a quick-view summary of the performance level required (PL_r) for each safety function (see [Table A.1](#)). However, for full requirements and detailed explanations, refer to [Clauses 5](#) and [6](#).

Table A.1 — Safety functions and their PL_r

Area	No.	Safety function/devices	PL _r	Subclause of ISO 19085-1:2017	Subclause of ISO 19085-8:2017
Start	1	Control power-on	c		5.3
	2	Interlocking of control power-on with safeguards	c		5.3
Stop	3	Normal stop (braking function excluded)	c	5.4.2	
	4	Emergency stop (braking function excluded)	c	5.4.4	
Braking	5	Braking function	b/c	5.5	
	6	Interlocking of brake release	c	6.4.3	
Mode selection	7	Mode selection	c	5.6	
	8	Selection of the processing unit	b		5.6
Spindle speed	9	Indication of selected speed	b		5.7.2
	10	Cutterblock unit speed selection	c		5.7.2
	11	Cutterblock rotational speed monitoring	c	5.7.3	5.7.3
Controls	12	Manual reset	c	5.9	
	13	Machine moving parts speed monitoring	b		5.11
	14	Time delay	c	5.12	
Safeguards	15	Hold to run control	c	6.5.3	
	16	Interlocking of moveable guards	c	6.5.2.2	
	17	Interlocking with guard locking of moveable guards	c	6.5.2.3	
	18	Interlocking of feed with trip device	c		6.6.4
Interlocking	19	Interlocking of cutterblock unit rest position with its drive	b		5.3
	20	Interlocking of work height opening movement with processing units' position	b		6.9.4
	21	Interlocking of feed with over-thickness protection device	b		6.10
	22	Interlocking of end-stop with cutterblock unit or anti-kickback device	c		6.10
Adjustment	23	Height adjustment with work piece detection	b		6.9.4
Clamping	24	Interlocking of pressure device clamping position with relevant processing unit	c		6.8
	25	Interlocking of vacuum clamping with relevant processing unit	b		6.8