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ISO 19085-8

Second edition
2024-07

Woodworking machines — Safety —

Part 8: Wide belt sanding machines and surface treating machines

Machines à bois — Sécurité —

Partie 8: Machines de ponçage à large bande et machines de traitement de surface

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Contents

Page

Foreword

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

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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 second edition cancels and replaces the first edition (ISO 19085-8:2017), which has been technically revised.

The main changes are as follows:

— the Title has been adapted to better reflect the scope, with its new additions;

— the Scope now specifies that machines are intended for continuous production use;

— surface treating machines and multi blade unit for grooving have been added and covered;

— the machine height capacity has been increased from 550 mm to 700 mm;

— the list of significant hazards has been moved to a new Annex A;

— the structure has been simplified, in particular in 5.6;

— subclause 6.2 has been updated and a new full noise test code has been added in Annex F.

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

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

Introduction

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

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

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

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (e.g. regulators, accident prevention organisations, market surveillance).

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

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises);

— consumers (in case of machinery intended for use by consumers).

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

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

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards (as defined in ISO 12100), 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, 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 subclauses of ISO 19085-1. Each part includes replacements and additions to the common requirements given in ISO 19085-1.

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

Clauses 1 to 3 are specific to each part and therefore are distinct from ISO 19085-1:2021, Clauses 1 to 3.

For Clauses 4 to 7 and the annexes, each subclause in ISO 19085-1:2021 is cited as either:

— confirmed as a whole;

— confirmed with additions;

— excluded entirely; 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.”.

Woodworking machines — Safety —

Part 8:
Wide belt sanding machines and surface treating machines

1 Scope

This document specifies the safety requirements and measures for wide belt sanding machines (defined in 3.1) and for surface treating machines (defined in 3.2) capable of continuous production use, altogether referred to as "machines".

This document deals with all significant hazards, hazardous situations and events, as listed in Annex A, relevant to the machines, when operated, adjusted and maintained as intended and under the conditions foreseen by the manufacturer, including reasonably foreseeable misuse. Transport, assembly, dismantling, disabling and scrapping phases are also taken into account.

This document 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;

— multi blade unit;

— conveyor directly controlled by the machine;

— additional workpiece vacuum clamping device;

— antistatic bar unit.

NOTE 1 An antistatic bar is a device that eliminates electrostatic charges on the workpiece to ease its subsequent cleaning from dust by airflow.

This document is also applicable to machines fitted with a laser engraving unit, but the specific hazards of this unit have not been dealt with.

The machines are designed to process workpieces with flat surface and even thickness, in shape of panels or beams or frames, consisting of:

a) solid wood;

b) material with similar physical characteristics to wood (see ISO 19085-1:2021, 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, 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 700 mm;

— systems for powered loading or unloading, or both, of the workpiece to or from a single machine;

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

— out-feed workpieces on machines with feed speed higher than 60 m/min;

— interfacing of the machine with any other machine.

This document is not applicable to machines intended for use in a 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 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13849-1:2023, *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*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010, ISO 13849-1:2023, ISO 19085-1:2021 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
wide belt sanding machine
machine used to either calibrate or sand, or both, workpieces with flat surface and even thickness, fitted with integrated feed and sanding belts positioned either above or below the workpiece level, or both

Note 1 to entry: Figures 1 and 2 show examples of different sanding unit positions (safeguarding devices are not illustrated). Sanding belts can rotate in both directions, against the feed or in "climb cutting", as defined in ISO 19085-1:2021, 3.14 and 3.15.

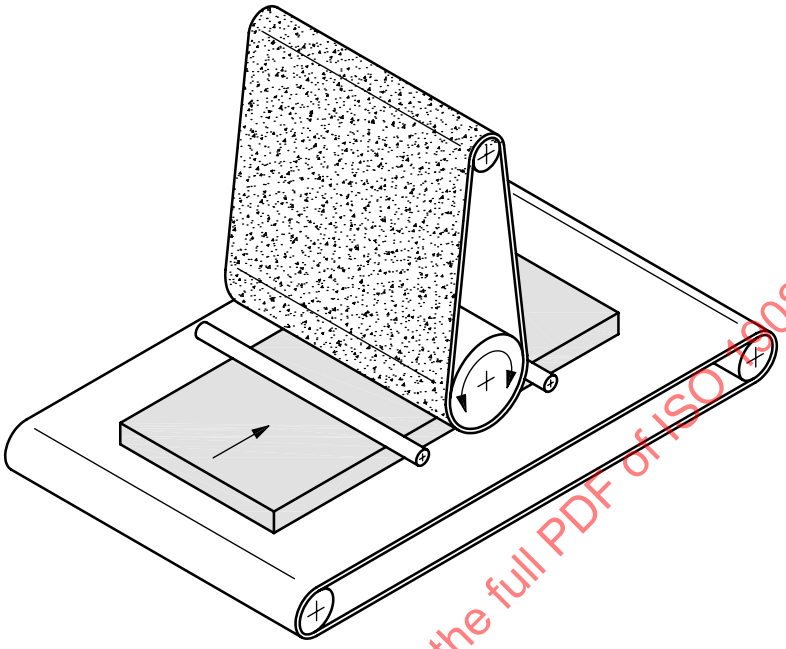


Figure 1 — Example of a sanding unit positioned above the workpiece level

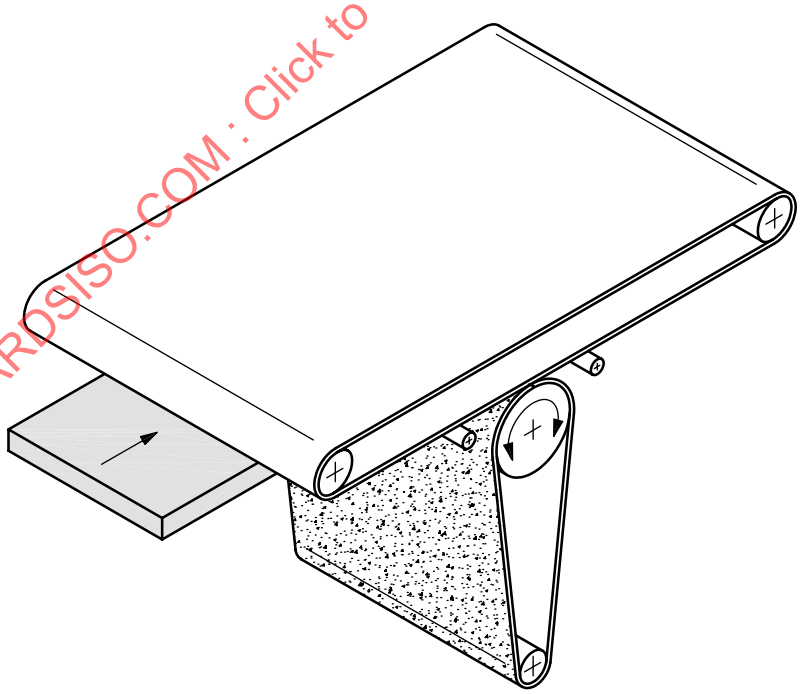


Figure 2 — Example of a sanding unit positioned below the workpiece level

3.2
surface treating machine
machine used to treat the surface of workpieces with flat surface and even thickness, fitted with

— an integrated feed, and

— any of the following working units,

  — *cleaning brushing unit* (3.4),

  — *satining roller unit* (3.5),

  — *disk brushing unit* (3.6),

  — *texturing brushing roller unit* (3.7),

  — *texturing brushing belt unit* (3.8)

positioned either above or below the work piece level, or both, with no sanding belt unit

Note 1 to entry: Typical surface treatments are texturing and brushing.

3.3
transversal sanding unit
unit with sanding belt working perpendicularly to the panel feed direction positioned above or below the workpiece level

Note 1 to entry: See Figure 3 for an example of a transversal sanding unit (safeguarding devices are not illustrated).

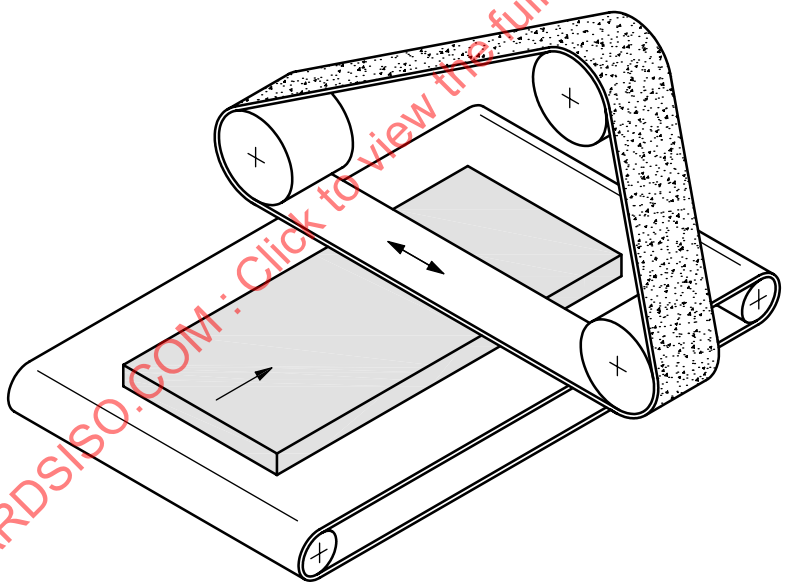


Figure 3 — Example of a transversal sanding unit

3.4
cleaning brushing unit
unit with either a brushing roller or brushing belt, both bearing non-abrasive brushes, positioned above or below the workpiece level

3.5
satining roller unit
unit with satining roller positioned above or below the workpiece level and working in parallel to the workpiece feed direction

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

3.6
disk brushing unit
unit with rotating abrasive disks positioned above or below the workpiece level

Note 1 to entry: See Figure 4 for an example of a disk brushing unit (safeguarding devices are not illustrated).

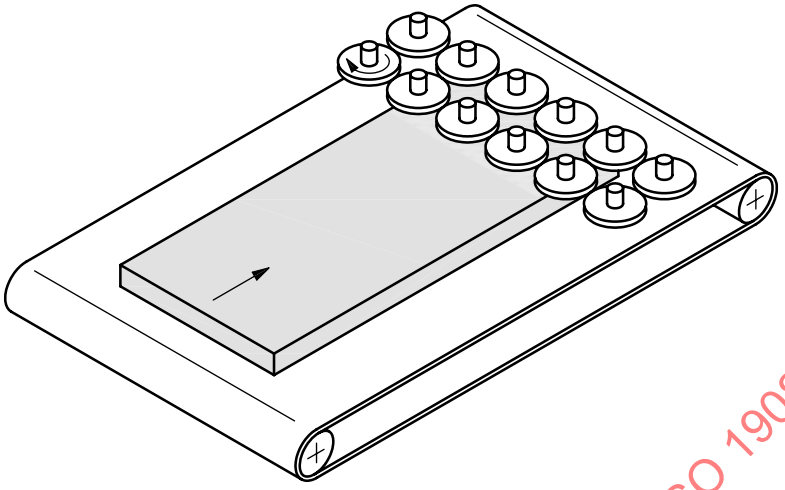


Figure 4 — Example of a disk brushing unit

3.7
texturing brushing roller unit
unit with abrasive brushing roller positioned above or below the workpiece level and working in parallel to the workpiece feed direction

Note 1 to entry: Texturing brushing roller unit can rotate in both directions, against the feed or in "climb cutting".

3.8
texturing brushing belt unit
unit with abrasive brushes mounted on a belt positioned above or below the workpiece level and working perpendicularly to the workpiece feed direction

Note 1 to entry: See Figure 5 for an example of a texturing brushing belt unit (safeguarding devices are not illustrated).

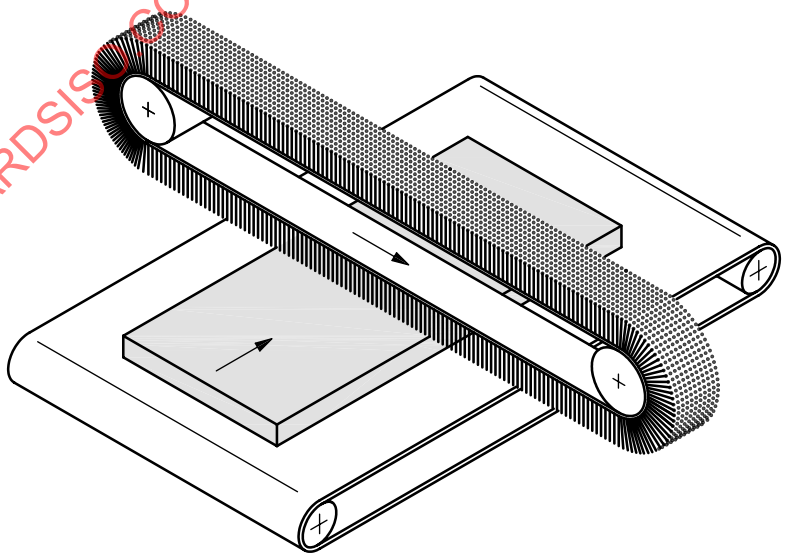


Figure 5 — Example of a texturing brushing belt unit

3.9
texturing band saw unit
unit with a band saw for texturing panel surface positioned above or below the workpiece level and working perpendicularly to the workpiece feed direction

Note 1 to entry: See Figure 6 for an example of a texturing band saw unit (safeguarding devices are not illustrated).

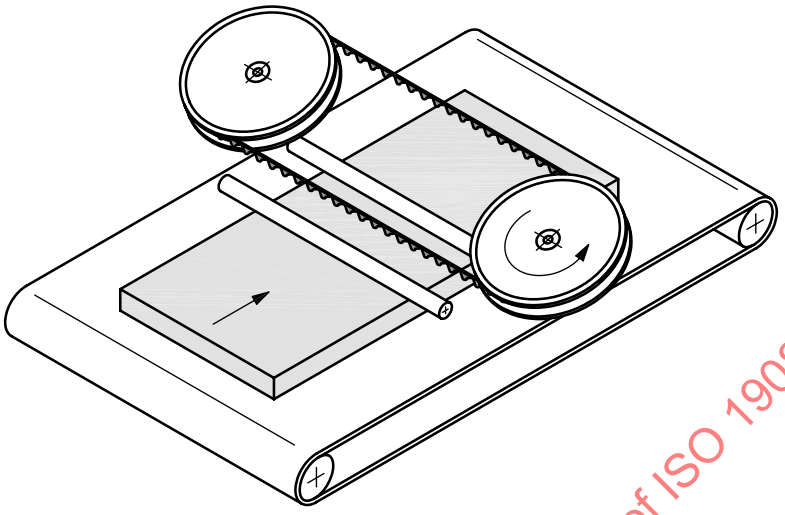


Figure 6 — Example of a texturing band saw unit

3.10
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 workpiece level and working in parallel to the workpiece feed direction and against the feed

Note 1 to entry: See Figure 7 for an example of a cutterblock unit (safeguarding devices are not illustrated) and EN 847-1 for the description of a complex tool.

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

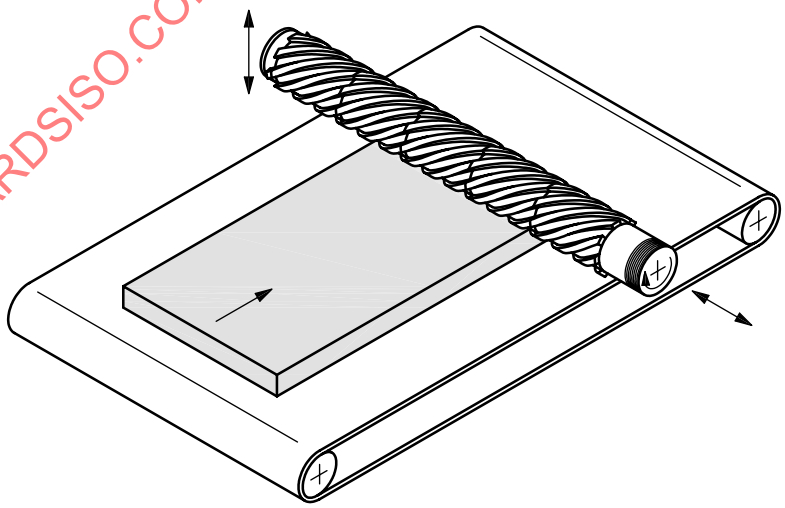


Figure 7 — Example of a cutterblock unit

3.11
spiked roller unit
unit with spiked roller for creating a woodworm effect on the workpiece surface positioned above or below the workpiece level and working in parallel to the workpiece feed direction and in "climb cutting"

Note 1 to entry: See Figure 8 for an example of a spiked roller unit (safeguarding devices are not illustrated).

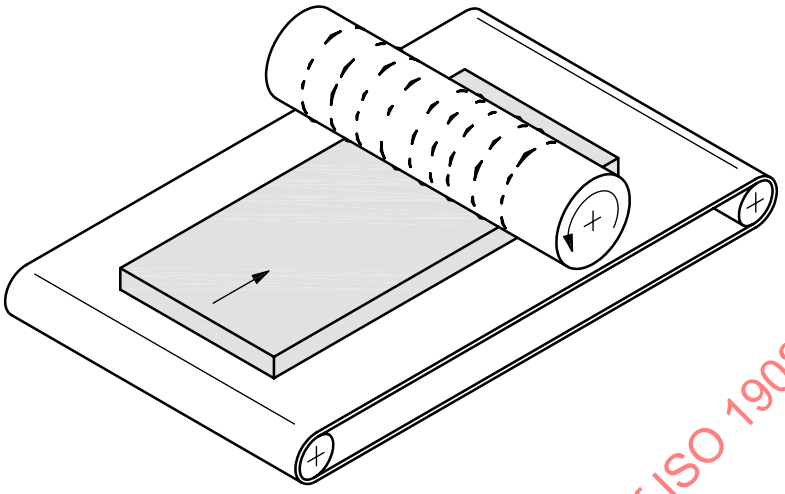


Figure 8 — Example of a spiked roller unit

3.12
multi blade unit
unit for grooving with saw blades mounted at pre-set distances on a shaft above the workpiece, working in parallel to the feed direction and against the feed

Note 1 to entry: See Figure 9 for an example of a multi blade unit (safeguarding devices are not illustrated).

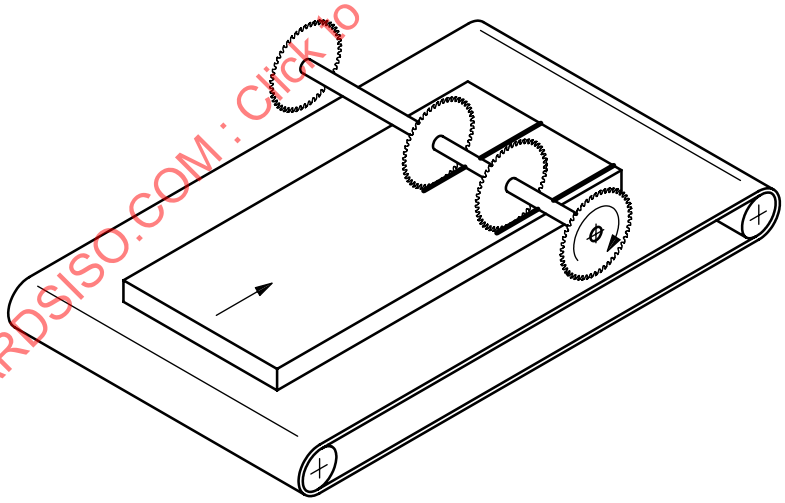


Figure 9 — Example of a multi blade unit

3.13
rest position
position of a processing unit when not in contact with the workpiece

4 Safety requirements and measures for controls

4.1 Safety and reliability of control systems

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

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

4.2 Control devices

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

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 vertical edges of the opening;

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.

4.3 Start

4.3.1 Direct start

ISO 19085-1:2021, 4.3.1, does not apply.

4.3.2 Start via control power-on

ISO 19085-1:2021, 4.3.2, applies with the following additions.

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

The multi blade unit shall not leave its rest position towards the workpiece if its blades are not rotating.

The safety related part of control system (SRP/CS) for interlocking of the cutterblock rotation with the rest position of the cutterblock unit shall achieve PL_r = b.

The SRP/CS for interlocking of the saw blades rotation with the rest position of the of the multi blade unit shall achieve PL_r = b.

4.4 Safe stops

4.4.1 General

ISO 19085-1:2021, 4.4.1, applies with the following additions.

Machine actuators to be stopped do not include those for movements smaller than 3 mm of any processing unit, i.e. adjustments and switch between operating and rest positions.

When a safe stop is actuated, all processing units shall retract to their rest position.

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.

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 in accordance with 5.5.2 are open, fulfilling the following requirements.

a) Selecting the setting mode shall stop the feed and all processing units.

b) Each processing unit other than cutterblock unit, texturing band saw unit, multi blade unit and spiked roller unit 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 can be necessary. The SRP/CS for the selection of the processing unit shall achieve PL_r = b.

4.7 Tool speed changing

4.7.1 Speed changing by shifting the belts on the pulleys

ISO 19085-1:2021, 4.7.1, does not apply.

4.7.2 Speed changing by incremental speed change motor

ISO 19085-1:2021, 4.7.2, is replaced by the following text.

On machines with an incremental speed change motor, for example a change pole motor, the selected speed shall be indicated for the cutterblock unit and for the multi blade unit.

The SRP/CS for cutterblock unit speed selection shall achieve PL_r = c.

The SRP/CS for multi blade unit speed selection shall achieve PL_r = c.

The SRP/CS for indication of selected speed for the cutterblock unit shall achieve PL_r = b.

The SRP/CS for indication of selected speed for the multi blade unit shall achieve PL_r = b.

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

4.7.3 Infinitely variable speed frequency inverter

ISO 19085-1:2021, 4.7.3, applies with the following additions.

Requirements on speed monitoring stated in ISO 19085-1:2021, 4.7.3, apply to the maximum rotational speed set by the machine manufacturer for the cutterblock and for the saw blades of a multi blade unit.

4.8 Failure of any power supply

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

Non-return valves are not required where other measures to maintain workpiece clamping are provided, like a reservoir.

4.9 Manual reset control

ISO 19085-1:2021, 4.9, applies.

4.10 Standstill detection and monitoring

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

4.11 Machine moving parts speed monitoring

ISO 19085-1:2021, 4.11, applies.

4.12 Time delay

ISO 19085-1:2021, 4.12, applies.

4.13 Teleservice

ISO 19085-1:2021, 4.13, applies.

5 Safety requirements and measures for protection against mechanical hazards

5.1 Stability

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

The requirements on an integrated device for moving the machine and ISO 19085-1:2021, Annex C, do not apply.

5.2 Risk of break-up during operation

ISO 19085-1:2021, 5.2, applies.

5.3 Tool holder and tool design

ISO 19085-1:2021, 5.3, is replaced by the following text.

The cutterblock shall be of a round form complex cylindrical type in accordance with EN 847-1:2017.

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

The saw blades of the multi blade unit shall be in accordance with EN 847-1:2017.

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

Verification is done by checking relevant drawings and inspecting the machine.

5.4 Braking

5.4.1 Braking of tools

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

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

The braking function shall be tested in accordance with Annex D.

5.4.2 Maximum run-down time

ISO 19085-1:2021, 5.4.2, applies.

5.4.3 Brake release

ISO 19085-1:2021, 5.4.3, applies.

5.5 Safeguards

5.5.1 Fixed guards

ISO 19085-1:2021, 5.5.1, applies.

5.5.2 Interlocking moveable guards

5.5.2.1 General

ISO 19085-1:2021, 5.5.2.1, applies.

5.5.2.2 Moveable guards with interlocking

ISO 19085-1:2021, 5.5.2.2, applies.

5.5.2.3 Moveable 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, applies.

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 protecting device (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 tools

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

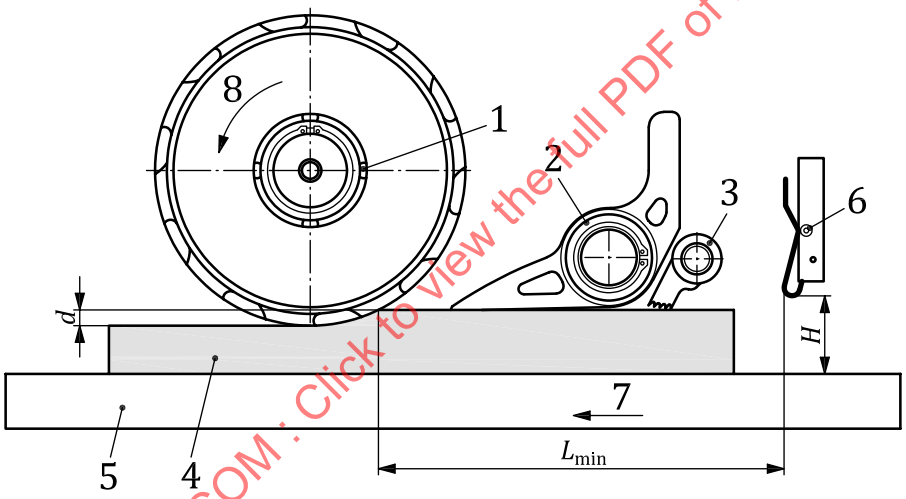
Where access is provided for maintenance, adjustment or setting, this access shall be via movable guards with interlocking, or with interlocking and guard locking if the rundown time is more than 2 s, that shall stop any dangerous movement.

The distance L_{min} between the cutterblock and the in-feed opening of the machine enclosure shall be (see Figure 10):

a) $L_{min} \geq 200$ mm for an in-feed opening height $H \leq 160$ mm;

b) $L_{min} \geq 1{,}25$ for an in-feed opening height $H > 160$ mm.

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



Key

d	maximum cutterblock cutting depth	4	workpiece
H	maximum work height capacity	5	workpiece support
1	cutterblock	6	trip device
2	pressure device	7	feed direction
3	anti-kickback fingers	8	direction of rotation

Figure 10 — In-feed opening — Minimum distance to cutterblock

5.6.1.2 On machines provided with a multi blade unit, the following additional requirements apply:

a) multi blade unit shall be positioned in the last or last but one position and shall operate against the feed;

b) at the outfeed end of the machine, access to the multi blade unit shall be prevented by fixed guards making a tunnel extending at least 850 mm from any cutting, crushing, shearing, drawing in and entanglement point.

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

5.6.2 Safeguarding of shearing zones, crushing zones and drawing-in points

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

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) The 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 workpiece surface shall not be more than 8 mm for any workpiece thickness.

d) The tripping force shall be less than or equal to 50 N.

e) With regard to the gap between the trip device (see Figure 10 Key 6) and the workpiece, the horizontal distance from the trip device to the hazard point, the response time of the trip device and the stopping time of the feed, the trip device shall be designed and positioned so that the front end of a test wedge, resting on the workpiece moving at the maximum feed speed against the trip device, 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 workpiece feed with the trip device shall achieve PL_r = c.

Information related to residual risks at the in-feed and out-feed openings of the machine shall be provided in the instruction handbook [see 7.3.2 b) 1)].

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

5.6.3 Guarding of drives

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

5.7 Impact hazard

ISO 19085-1:2021, 5.7, 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 workpiece support is higher than 1 200 mm above the floor level, the feed speed limit shall be 25 m/min.

For stand-alone machines with feed speed exceeding the above limit values and up to 60 m/min, an out-feed unloading table shall be connected to the machine.

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

5.8 Clamping devices

ISO 19085-1:2021, 5.8, 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.

For multi blade unit, pressure pads shall be slotted in correspondence of the saw blades.

As an exception, workpiece 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 workpiece.

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 workpiece vacuum clamping, when clamping is ensured by vacuum alone, with the relevant processing unit position shall achieve PL_r = b.

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

5.9 Measures against ejection

5.9.1 General

ISO 19085-1:2021, 5.9.1, applies with the following additions.

Where the last processing unit is a sanding unit, texturing brushing roller unit or satining roller unit, and where it 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 these cases.

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.

Guards used to prevent direct ejection of parts from any processing unit except a cutterblock unit, multi blade unit and cleaning brushing unit shall be of class B in accordance with 5.9.2.3.

Guards used to prevent direct ejection of parts from cutterblock units and multi blade units shall be of class A in accordance with 5.9.2.2.

An impact test for guards shall be carried out in accordance with Annex E.

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.

5.9.3 Anti-kickback devices

Subclause specific to this document.

5.9.3.1 Anti-kickback devices for machines without cutterblock

Machines without a 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 G.

Verification is done by checking relevant drawings, inspecting the machine, measurement, functional testing of the machine and the test in Annex G shall be performed.

5.9.3.2 Anti-kickback devices for machines with cutterblock

Machines provided with a 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 in accordance with the following requirements.

a) The anti-kickback fingers shall be located before the first pressure device at the in-feed (see Figure 10) and be effective against the workpiece 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 thickness of the finger 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 11 for any cutting depth for which the machine is designed, the angle β shall be more than 32° and less than 45°.

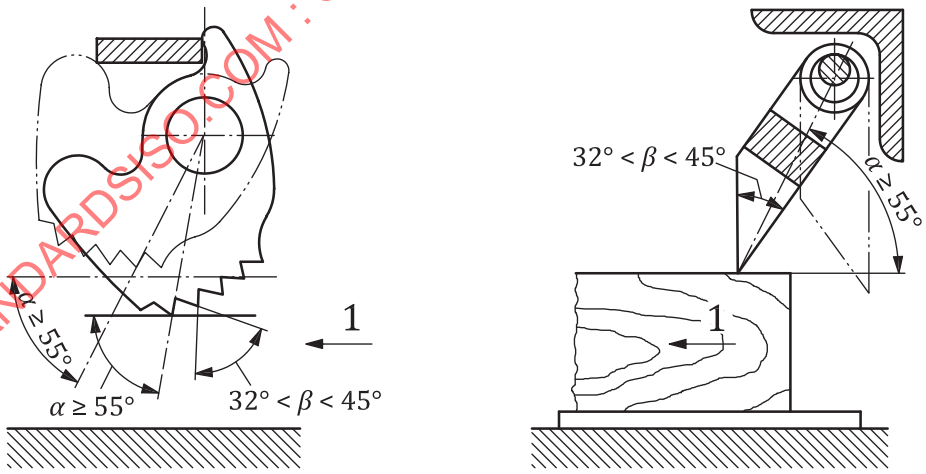
f) The space in between fingers shall not be wider than half the width of the fingers.

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 workpiece, and at least 2 mm above the horizontal tangent to the cutting circle outside diameter when the relevant cutterblock unit is positioned below the workpiece.

j) They shall pass the kickback test in Annex H.



Key

1 feed direction

Figure 11 — Anti-kickback fingers

Verification is done by checking relevant drawings, inspecting the machine, measurement, functional testing of the machine and the test in Annex H shall be performed.

5.9.4 Adjustment of machine work height

Subclause specific to this document.

In machines where processing units are located under the workpiece, 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 7.3.2 h).

b) For machines where work height adjustment is under numerical control or computerized numerical control, opening movement while the processing units are running shall only be possible either:

   1) by providing a means of detecting that any workpiece that has passed the in-feed opening of the machine has passed the processing units, the SRP/CS for the interlocking of the work height opening movement with the workpiece detection shall achieve PL_r = b on machines with no cutterblock unit and no multi blade unit, PL_r = c where one of these units is provided; 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 on machines with no cutterblock unit and no multi blade unit, PL_r = c where one of these units is provided.

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

5.10 Workpiece support and guides

ISO 19085-1:2021, 5.10, applies with the following additions.

The workpiece support shall fulfil the following requirements.

a) It shall be lockable in position during processing unless its movement is self-locking.

b) A workpiece over-thickness protection device shall be provided and located at the in-feed side of the machine, to prevent the feeding of too thick workpieces. This device may be of mechanical or electro-mechanical type; if the latter, it shall be interlocked with the workpiece feed. The SRP/CS for the interlocking of the workpiece over-thickness protection device with the feed shall achieve PL_r = b.

On machines with a cutterblock unit, an electro-mechanical or a mechanical end stop shall also be provided to prevent contact between the workpiece support and the anti-kickback device and the cutterblock in any position. The SRP/CS for the interlocking of the electro-mechanical end-stop with the height adjustment to prevent contact shall achieve PL_r = c.

On machines with a multi blade unit, an electro-mechanical or a mechanical end stop shall also be provided to limit the grooving depth so that the saw blade tips stay at least 5 mm far from the workpiece support. The SRP/CS for the interlocking of the electro-mechanical end-stop with the height adjustment to limit the grooving depth shall achieve PL_r = c.

6 Safety requirements and measures for protection against other hazards

6.1 Fire

ISO 19085-1:2021, 6.1, applies with the following additions.

On machines provided with a cutterblock unit, the requirements in 5.2 and 5.10 apply to avoid sparks as a result of contact between cutting knives and the workpiece support.

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.

The noise test for the machines shall be carried out in accordance with the code given in Annex F.

6.3 Emission of chips and dust

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

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

For cutterblock unit and multi blade unit, the minimum airflow rate should be 2 000 m^3/h per meter of machine width capacity.

For all other processing units, the minimum airflow rate at each unit should be 1 600 m^3/h per meter of machine width capacity.

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

On machines with manual loading/unloading, the height of the workpiece 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.

6.6 Lighting

ISO 19085-1:2021, 6.6, does not apply.

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, applies.

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 Markings

7.2.1 General

ISO 19085-1:2021, 7.2.1, applies.

7.2.2 Additional markings

ISO 19085-1:2021, 7.2.2, is replaced by the following text.

The following additional information shall be marked legibly and indelibly throughout the expected life of the machine, either directly on the machine, e.g. by engraving, etching, or by using labels or plates permanently fixed to the machine, e.g. by riveting or stickers.

a) Arrows for indication of direction of rotation shall be provided at each processing unit having one direction of rotation and a double arrow for processing units that can rotate in both directions.

b) For cutterblock unit and multi blade unit requiring speed monitoring in accordance with 4.7.3, a label, positioned close to the unit, stating the value of the maximum rotational speed set by the machine manufacturer for the relevant tools and a label stating to check the instruction handbook.

For marking of the cutterblock and the saw blades of the multi blade unit, the requirements of EN 847-1:2017 apply.

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, applies with the following additions.

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 workpieces of different thickness or overlapping at the same time, as this can cause the workpieces to be ejected from the machine, e.g. by kickback;

   2) trying to manually unload a workpiece already engaged by the feeding system.

b) The warning regarding residual risk shall also include:

   1) contact with any processing unit from in-feed and out-feed openings;

   2) processing of workpieces with cut-outs, e.g. window frames; these workpieces cause a shearing hazard with the front edge of the in-feed table and with the upper edge of the infeed opening.

c) Instruction for safe use shall also include information to use only cutterblocks and saw blades for the multi blade unit rated for a rotational speed equal to or higher than the monitored rotational speed of the relevant tool indicated by the related label [see 7.3.2 b)].

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 the 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) Include information that, before changing the cutterblock or the saw blades of the multi blade unit, the machine shall be isolated.

f) Include information that the maximum length of the workpieces to be processed shall not exceed the minimum space at the out-feed end of the machine minus 500 mm.

g) Include information that only cutterblocks conforming to EN 847-1:2017 marked MEC or MAN shall be used.

h) In machines where processing units are positioned under the workpiece support, information that increasing the machine work height, when operated by hand-wheel or power-operated under hold-to-run, is only permissible after checking that no workpiece is inside the machine or all operating units positioned under the workpiece support are in their rest position or not running [see 5.9.4 a)].

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 the machines, and which require action to eliminate or reduce the risk.

Table A.1 — List of significant hazards

No.	Hazards, hazardous situations and hazardous events	Subclause of ISO 12100:2010	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, 6.15, 7.2, 7.3
	b) relative location		4.2, 4.3, 4.8, 5.6, 7.2
	c) mass and stability (potential energy of elements which may move under the effect of gravity)		4.8, 4.9
	d) mass and velocity (kinetic energy of elements in controlled or uncontrolled motion)		4.3, 4.8, 5.6, 5.10
	e) mechanical strength		5.2
	— Accumulation of energy inside the machinery due to		
	f) elastic elements (springs);	6.2.10, 6.3.5.4	5.6, 5.10, 6.5
	g) liquids and gases under pressure;		4.8, 6.7, 6.8, 6.13, 7.3
1.1	Crushing hazard		4.3, 4.4, 4.8, 5.4, 5.10, 5.6, 6.12, 6.13
1.2	Shearing hazard		4.3, 4.4, 5.4, 5.10, 5.6, 6.12, 6.13
1.3	Cutting or severing hazard		4.3, 4.4, 4.5, 4.8, 5.4, 5.6, 6.12, 6.13
1.4	Entanglement hazard		4.4, 4.5, 5.6, 6.12, 6.13
1.5	Drawing-in or trapping hazard		4.3, 4.4, 4.5, 5.4, 5.6, 6.12, 6.13
1.6	Impact hazard		4.3, 5.7, 5.10, 6.12
1.9	High pressure fluid injection or ejection hazard	6.2.10	4.4, 6.7, 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		
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	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

Table A.1 *(continued)*

No.	Hazards, hazardous situations and hazardous events	Subclause of ISO 12100:2010	Subclause of this document
7.2	Fire	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	7.3
8.5	Mental overload and underload, stress	6.2.8	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, 4.5, 4.7, 4.8, 5.6, 6.12, 6.13
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, 6.12
10.2	Restoration of energy supply after an interruption	6.2.11.4	4.9, 6.7
10.3	External influences on electrical equipment	6.2.11.11	4.1, 6.9
10.4	Other external influences (gravity)	6.2.12.1	5.10
10.5	Errors in the software	6.2.11.7	4.1
10.6	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities)	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, 6.12
12	Variations 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	4.9
14	Failure of the control circuit	6.2.11, 6.3.5.4	4.1
15	Errors of fitting	6.2.7, 6.4.5	6.12
16	Break-up during operation	6.2.3	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 for each safety function. However, refer to Clauses 4 and 5 for full requirements.

Table B.1 — Safety functions and their PL_r

Area		Safety function/devices	PL_r	Subclause of ISO 19085-1:2021	Subclause of this document
Start	1	Prevention of unexpected control power-on	c	4.3.2	
	2	Interlocking of control power-on with safeguards	c	4.3.2	
	3	Interlocking of cutterblock unit rest position with its drive	b		4.3.2
	4	Interlocking of multi blade unit rest position with its drive	b		4.3.2
Stop	5	Normal stop (braking function excluded)	c	4.4.2	
	6	Emergency stop (braking function excluded)	c	4.4.4	
Braking	7	Activation of the brakes	c	4.5	
	8	Electric braking system	b	4.5	
	9	SS1 of PDS(SR)	c	4.5	
	10	Interlocking of brake release	c	5.4.3	
Mode selection	11	Mode selection	c	4.6	
	12	Selection of the processing unit	b		4.6
Spindle speed	13	Indication of selected speed for cutterblock unit	b		4.7.2
	14	Indication of selected speed for multi blade unit	b		4.7.2
	15	Cutterblock unit speed selection	c		4.7.2
	16	Multi blade unit speed selection	c		4.7.2
	17	Cutterblock rotational speed monitoring	c	4.7.3	4.7.3
	18	Multi blades rotational speed monitoring	c	4.7.3	4.7.3
Controls	19	Manual reset	c	4.9	
	20	speed monitoring of moving parts (except tools)	b	4.11	
	21	Time delay	c	4.12	
Safeguards	22	Interlocking of moveable guards	c	5.5.2.2, 5.5.2.3	
	23	Guard locking of moveable guards	c	5.5.2.3	
	24	Hold to run control	b/c	5.5.3	

Table B.1 *(continued)*

Area		Safety function/devices	PL_r	Subclause of ISO 19085-1:2021	Subclause of this document
Interlocking	25	Interlocking of dangerous movements with PSPE	c	5.5.6	5.6.2
	26	Interlocking of work height opening movement with workpiece detection	b/c		5.9.4
	27	Interlocking of work height opening movement with processing units' position	b/c		5.9.4
	28	Interlocking of feed with over-thickness protection device	b		5.10
	29	Interlocking of electro-mechanical end-stop with height adjustment to prevent contact	c		5.10
	30	Interlocking of electro-mechanical end-stop with height adjustment to limit grooving depth	c		5.10
Clamping	31	Interlocking of pressure device clamping position with relevant processing unit position	c		5.8
	32	Interlocking of vacuum clamping with relevant processing unit position	b		5.8

Annex C
(informative)

Stability test

ISO 19085-1:2021, Annex C, does not apply.

Annex D
(normative)

Test for braking function

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