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Woodworking machines — Safety —

Part 2: Horizontal beam panel circular sawing machines

Machines à bois — Sécurité —

Partie 2: Scies circulaires à panneaux horizontales à presseur

ICS: 13.110; 79.120.10

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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).

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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, 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.

This second edition cancels and replaces the first edition (ISO 19085-2:2017), which has been technically revised.

The main changes compared to the previous edition are as follows:

- [Clause 1](#) "Scope": machines are "intended for continuous production use", in line with Part 1, ed.2; other additional working units were added, as well as special workable materials, and an exclusion;
- the list of significant hazards is moved to an Annex. The following Clauses and Annexes are renumbered accordingly;
- the structure was simplified, thanks to simplifications in Part 1, ed.2; in particular, under [6.6](#);
- machines without panel pusher are included and fully covered, with a new paragraph in 6.6.4;
- other loading devices are considered, in 6.6.9.1, 6.6.9.2 and new 6.6.9.3;
- requirements on minimum gaps at the unloading area are added in new 6.6.10;
- new [7.2](#) and new updated full Noise Test Code in [Annex F](#), with reference to Part 1, ed.2.

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 to be provided to the user by the manufacturer.

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.

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, 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, 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.

Thus, [Clauses 4, 5, 6](#) and [7](#) 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.

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

— “ISO 19085-1:2020, [subclause/Annex], applies”;

— “ISO 19085-1:2020, [subclause/Annex], applies with the following additions.” or “ISO 19085-1:2020, [subclause/Annex], applies with the following additions, subdivided into further specific subclauses.”;

— “ISO 19085-1:2020, [subclause/Annex], does not apply.”;

— “ISO 19085-1:2020, [subclause/Annex], is replaced by the following text.” or “ISO 19085-1:2020, [subclause/Annex], is replaced by the following text, subdivided into further specific subclauses.”.

Specific subclauses and annexes in this document without correspondent in ISO 19085-1:2020 are indicated by the introductory sentence: “Subclause/Annex specific to this document.”.

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

Woodworking machines — Safety —

Part 2:

Horizontal beam panel circular sawing machines

1 Scope

This document gives the safety requirements and measures for horizontal beam panel circular sawing machines with the saw carriage of the front cutting line mounted below the work-piece support, which are manually and/or powered loaded and manually unloaded, designed for continuous production use, hereinafter referred to as “machines”.

It 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. Also, transport, assembly, dismantling, disabling and scrapping phases have been taken into account.

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

- side pressure device,
- device for powered unloading,
- unit for scoring,
- unit for post-formed/soft-formed edge pre-cutting,
- panel turning device,
- front side turn table,
- pushing out device,
- pneumatic clamping of the saw blade,
- powered panel loading device,
- device for grooving by milling tool,
- one or more additional cutting lines inside the machine for longitudinal and/or head cut (before the transversal cutting line),
- work-piece vacuum clamping as part of a front side turn table or of a panel loading device,
- panel pusher,
- independent panel pushers,
- additional panel pushers mounted on the panel pusher carriage,
- additional panel pusher with integrated label printer device,
- lifting platform,
- device for automatic loading of thin panels,
- device for service panels unloading by gravity,

- device for service panels powered unloading,
- device for panel unloading in limited space condition,
- loading or pre-loading roller conveyors,
- pressure beam with additional flaps to increase dust extraction efficiency,
- saw blade cooling system by air or water-air or oil-air.

The machines are designed for cutting panels consisting of

- a) solid wood,
- b) material with similar physical characteristics to wood (see ISO 19085-1:2020, 3.2),
- c) gypsum boards, gypsum bounded fibreboards,
- d) composite materials, with core consisting of e.g. polyurethane or mineral material, laminated with light alloy,
- e) cardboard,
- f) “sponge” / foam board,
- g) matrix engineered mineral boards, silicate boards,
- h) polymer-matrix composite materials and reinforced thermoplastic / thermoset / elastomeric materials,
- i) aluminium light alloy plates with a maximum thickness of 10 mm,
- j) composite boards made from the materials listed above.

This document does not deal with hazards related to:

- specific features that differ from the dashed list above;
- the machining of panels with milling tools for grooving;
- powered unloading of panels;
- rear half of split pressure beam on the front cutting line;
- the combination of a single machine being used with any other machine (as part of a line).

It is not applicable to:

- machines designed to process aluminium light alloy plates only,
- machines intended for use in potentially explosive atmospheres,
- 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 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

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

ISO 14118:2017, *Safety of machinery — Prevention of unexpected start-up*

ISO/DIS 19085-1:2020, *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 13849-1:2015, ISO/DIS 19085-1:2020 and the following apply.

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

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

3.1

horizontal beam panel sawing machine

machine, designed for cutting panels, fitted with one travelling *saw carriage* (3.6) per cutting line incorporating one or more circular saw blades

Note 1 to entry: The work-piece is supported in the horizontal plane and may be mechanically positioned by a panel pusher for the cuts and held in position during cutting by a pressure beam. The cutting stroke is power driven. Before the cutting stroke commences, the saw blade is automatically raised/lowered and is retracted or out of operation for the return stroke. The cut takes place only in a single straight line. For examples, see [Figure 1](#). The work-piece is loaded manually and/or by means of a powered panel loading device and manually unloaded. The machine may have any of the ~~devices/additional~~ working units listed in the scope.

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3.2

manual loading

operation where the operator puts the work-piece directly on the work-piece support from the front side of the machine, i.e. there is no intermediate loading device, which keeps the operator away from the machine front cutting line of at least 1 500 mm during operation

3.3

manual unloading

operation where the operator removes the work-piece directly from the work-piece support, i.e. there is no intermediate unloading device, which keeps the operator away from the machine front cutting line of at least 1 500 mm during operation

3.4

powered loading

operation where the work-pieces are put on the work-piece support mechanically and power driven, by e.g. a lifting unit or a loading device, normally a lifting platform

3.5

powered unloading

operation where the work-pieces are removed from the work-piece support mechanically and power driven, by e.g. a lifting unit or an unloading device

3.6

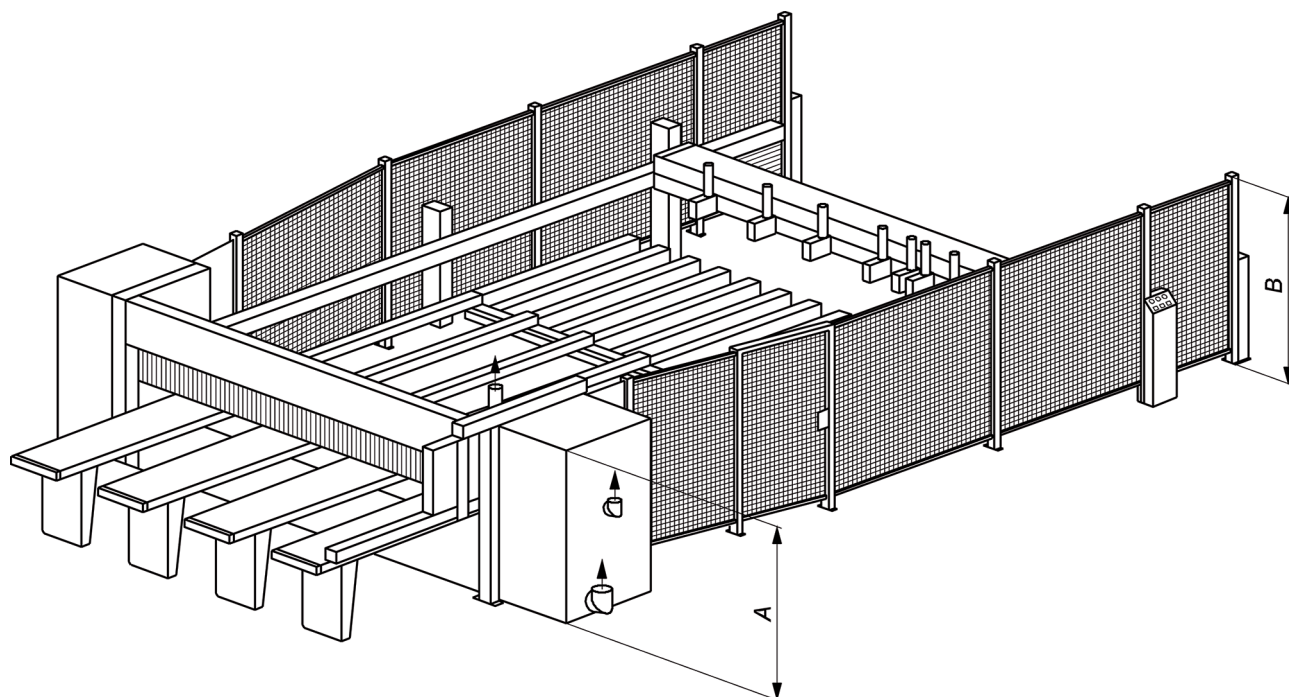
saw carriage

supporting unit of the saw blades, which performs the cutting stroke

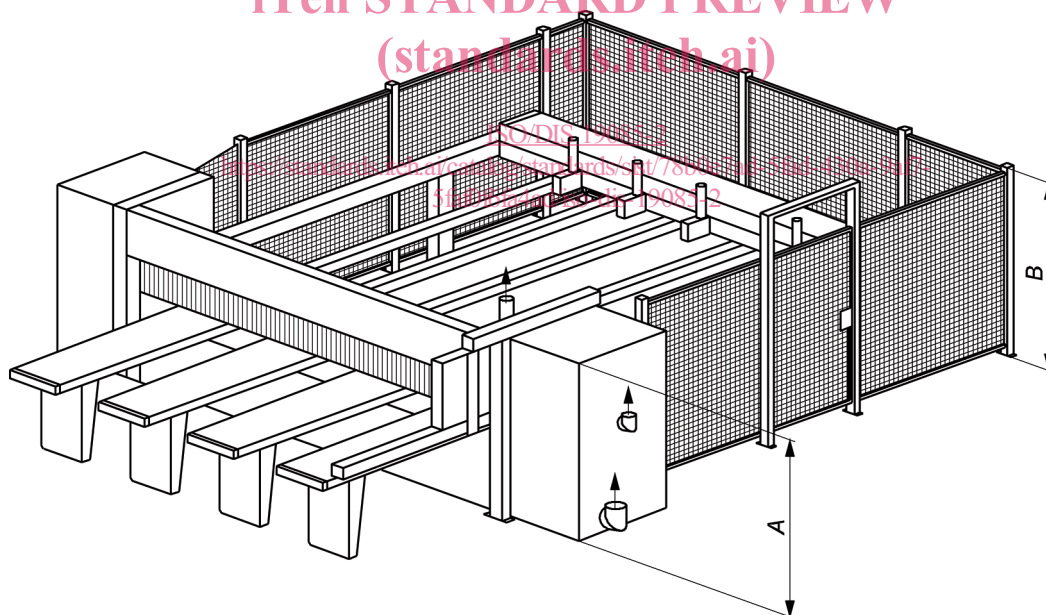
3.7

main saw blade

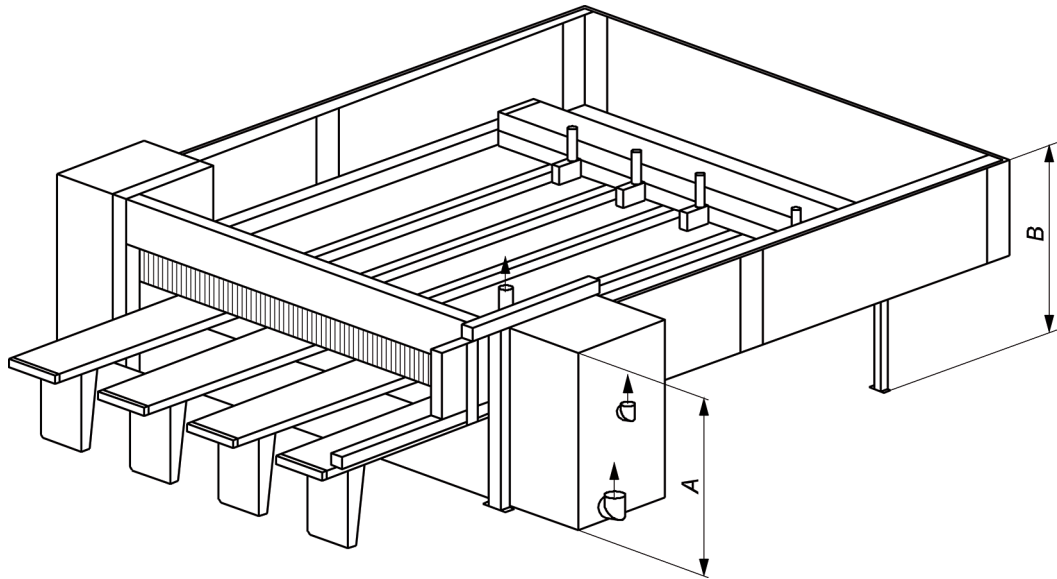
circular saw blade which is used for separating the work-piece



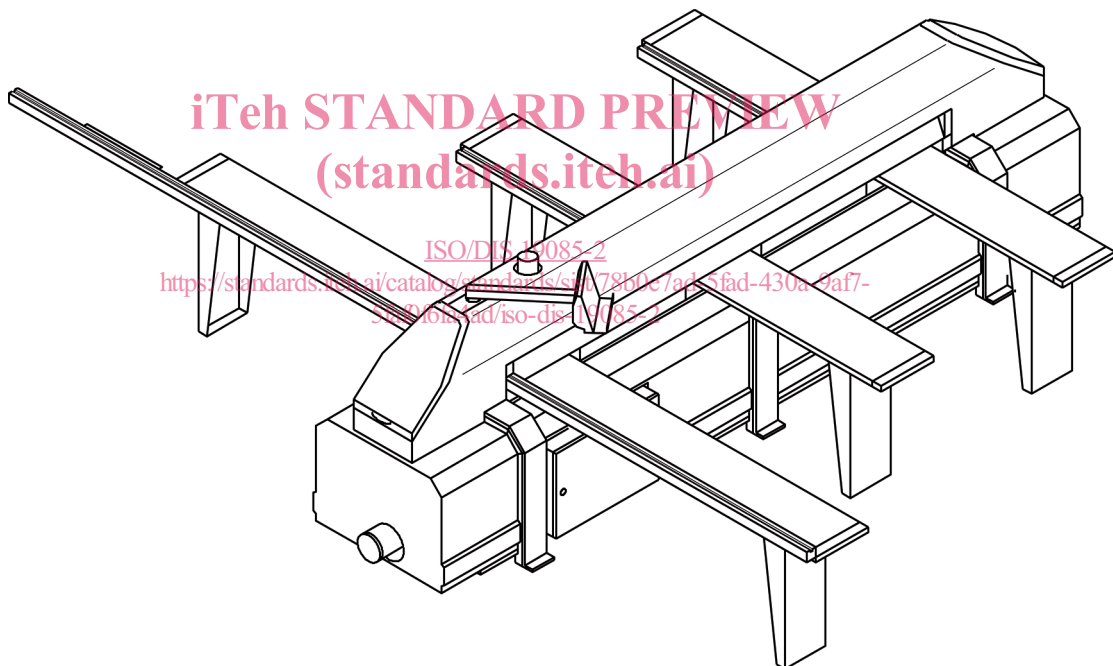
a) Example of a machine with panel pusher and panel loading from the rear side by a powered loading device and with perimeter fence and light barrier



b) Example of a machine with panel pusher and panel loading from the front side and perimeter fence



c) Example of a machine with panel pusher and panel loading from the front and with distance guards mounted on the machine frame



d) Example of a machine without panel pusher

Key

A Height of the front side fixed guards

B Height of the perimeter fence

Figure 1 — Examples of horizontal beam panel saws

3.8

saw carriage rest position

position in either the left or the right side of the machine body and outside of the cutting area to which the saw carriage (3.6) may return at the end of each cutting cycle (3.11)

3.9

saw blade rest position

position of the saw blade below the machine table

3.10

pressure beam rest position

highest position of the *pressure beam* (3.15)

3.11

cutting cycle

single cut operation consisting of vertical movements of the saw blades and horizontal movements of the *saw carriage* (3.6)

3.12

front cutting line

cutting line closest to the operator's position

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

3.13

longitudinal cutting line

additional cutting line inside the machine

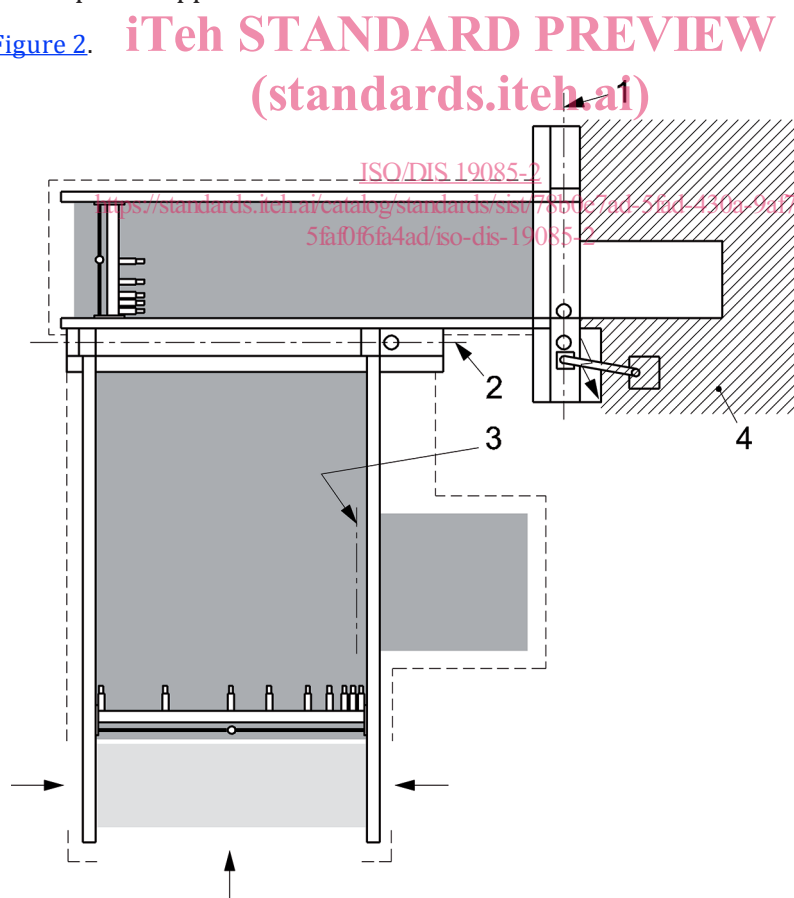
Note 1 to entry: A machine may be fitted with more longitudinal cutting lines. See [Figure 2](#).

3.14

head cutting line

first cutting line to divide a panel before further cuts, where the *saw carriage* (3.6) can be mounted below or above the work-piece support

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



Key

- | | |
|-----------------------------|-----------------------------------|
| 1 front cutting line | 3 head cutting line |
| 2 longitudinal cutting line | 4 operator position for unloading |

Figure 2 — Horizontal beam panel saw cutting lines

3.15**pressure beam**

work-piece clamping device extending across the full working width of the machine with the function to hold the work-piece down to the work-piece support during cutting

Note 1 to entry: The pressure beam is also part of the safeguarding of the saw blades in the cutting area.

3.16**panel pusher**

movable work-piece guiding device used to position the work-piece over the line of cut, and fitted with holding devices e.g. collets for holding the work-piece in position

Note 1 to entry: The positioning of the panel pusher may be under NC control.

3.17**side pressure device**

power operated movable work-piece guiding device to push the work-piece against the fence for right-angled cuts

3.18**panel turning device**

device integrated into the rear work-piece support to turn the panel for e.g. rectangular cut

3.19**pushing out device**

movable device to move last residues of a panel towards the front of the *pressure beam* (3.15) for easy take off by the operator

Note 1 to entry: The same function can be achieved by telescopic collets or by collets with extended length mounted on the panel pusher.

3.20**powered panel loading device**

device where the panel stack is put e.g. by a fork-lift truck or by a lifting unit either direct to a lifting platform or to a powered roller table which feeds the stack to the lifting table

Note 1 to entry: The lifting platform moves the uppermost panel or the required number of panels into a position which enables the panel pusher to bring the panels into the cutting position. The lifting platform itself can be fitted with an own panel pusher. The control circuits of the loading device are connected to the control circuits of the machine.

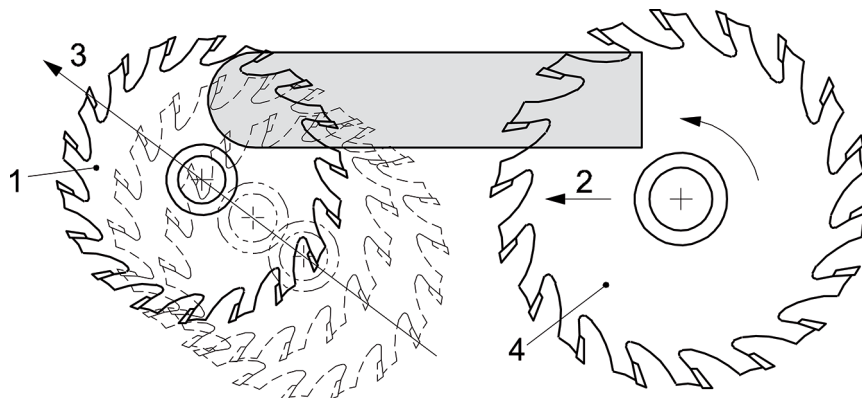
3.21**front side turn table**

table, mostly with air cushion, able to move power-driven parallel to the cutting line and turn by 90° for ergonomic positioning of very heavy work-pieces or piles of panels

3.22**post-formed edge pre-cutting**

soft-formed edge pre-cuttingcut made by a separate saw blade in the front profiled edge of the work-piece deep enough to prevent surface damage when the *main saw blade* (3.7) makes its cut

Note 1 to entry: See [Figure 3](#).



Key

- | | | | |
|---|--|---|------------------------------------|
| 1 | postformed/soft-formed edge pre-cutting saw blade | 2 | feed direction of the saw carriage |
| 3 | movement of post-formed/soft-formed edge pre-cutting saw blade | 4 | main saw blade |

Figure 3 — Post-formed/soft-formed edge pre-cutting

3.23

post-formed/soft-formed edge pre-cutting saw blade

saw blade used for post-formed edge pre-cutting

Note 1 to entry: This may be the scoring saw blade or a separate saw blade, specifically for this purpose.

4 Safety requirements and measures for controls

4.1 Safety and reliability of control systems

ISO 19085-1:2020, 4.1, applies with the following additions.

Table B.1 of this document replaces ISO 19085-1:2020, Table B.1.

4.2 Control devices

ISO 19085-1:2020, 4.2, applies with the following additions.

The following electrical control devices of the machine, if any, shall be positioned together on the main control panel, located at the front side of the machine such that the working area is visible from this position by the operator

- for start and stop of the cycle,
- for control power-on,
- for normal stop,
- for the movement of the panel pusher,
- for saw spindle speed changing,
- for the side pressure,
- for the pushing out device,
- for hold-to-run downwards movement of the pressure beam.

Emergency stop control devices shall be provided on the main control panel, on any auxiliary control panel, and at the following positions unless the main control panel or an auxiliary control panel is placed there already:

- a) on the front of the machine: at both sides of the loading/unloading opening;
- b) on the rear side of the machine with panel pusher: at one side of any access opening;
- c) on the rear side of the machine without panel pusher: at both sides of the loading/unloading opening.

An additional cycle start control device may be fitted on the front side of the machine, connected to one of the air-cushion tables. It shall be supplemented by a normal stop or an emergency stop control device adjacent to it.

If more than one additional control device for cycle start is provided at the air-cushion tables, only one shall be active at a time. The SRP/CS for selecting the active additional cycle-start control device may not achieve any PL.

The cycle start control device may be a push button or push bar (as long as cushion table maximum) and shall in any case be fitted with protection means against inadvertent actuation as specified in ISO 14118.

On machines without panel pusher, if more than one cycle start control device is available, only one of them shall be active at a time.

4.3 Start

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4.3.1 Direct start

ISO/DIS 19085-1:2020, 4.3.1, does not apply.
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4.3.2 Start via control power-on

ISO/DIS 19085-1:2020, 4.3.2, applies with the following additions.

The saw blades shall not leave their rest position before the saw blades rotation has been started, unless the saw carriage is in its rest position.

The saw carriage shall not leave its rest position before the saw blades rotation has been started when the saw blades have left their rest position.

The SRP/CS for the interlocking of the saw blades movement out of their rest position with saw the blades rotation and the saw carriage position shall achieve $PL_r = b$.

The SRP/CS for the interlocking of the saw carriage movement out of its rest position with the saw blades rotation and the saw blades position shall achieve $PL_r = b$.

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

4.3.3 Operating conditions

Subclause specific to this document.

During operation, all following conditions shall be met in the front cutting line.

- a) The pressure beam shall not leave its rest position as long as the safety curtain has not reached its guarding position.