
**Graphic technology — Safety
requirements for graphic technology
equipment and systems —**

**Part 3:
Binding and finishing equipment and
systems**

*Technologie graphique — Exigences de sécurité pour les systèmes et
l'équipement de technologie graphique —*

Partie 3: Systèmes et équipement de reliure et de finissage

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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 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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

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

This document was prepared by Technical Committee ISO/TC 130, *Graphic technology*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 198, *Printing and paper machinery — Safety*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and the second edition (ISO 12643-3:2010), which has been technically revised.

The main changes are as follows:

- in [5.2](#), requirements for interlocks have been included (specific clause in ISO 12643-1 has been deleted);
- in [5.3.4](#), requirements for residual pile monitoring as a safety device on hopper feeders have been revised
- in [5.4.4](#), requirements on feeders and feeding sections at gathering machines have been added;
- in [5.4.4.4](#), requirements for residual pile monitoring as a safety device on feeders at gathering machines have been revised
- in [5.4.5](#), the requirements on safety-related control systems for temperature control and temperature monitoring in the gluing unit at perfect binders have been revised;
- in [5.4.5.7](#), requirements for safeguarding milling head cutters at perfect binders have been added;
- in [5.4.5.9](#), requirements for emergency stop at perfect binders have been added;
- requirements related to hazards dealt with in ISO 12643-1 have been deleted throughout the document (inclusion in the list of significant hazards);

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- in [5.4.5](#), the requirements on safety-related control systems for temperature control and temperature monitoring in the gluing section for hardcover lines have been revised;
- in [5.9.2](#), requirements for retraction of knife and clamp at guillotine cutters have been added;
- in [5.9.6](#); [Figures 29](#) and [30](#) on guillotine cutters have been revised (30 mm added)
- the formula for the calculation of the minimum safety distance at guillotine cutters has been moved to A.1 as it also refers to the new [subclause 5.11](#);
- a new [subclause 5.11](#), Three-knife trimmers with manual infeed, has been added;
- in [Clause 6](#), the table for the verification of the safety requirements and/or protective/risk reduction measures has been added;
- the list of significant hazards has been moved to [Annex B](#);
- a reference to ISO 13849-2 has been added in Bibliography.

This document is intended to be used in conjunction with ISO 12643-1:2023.

A list of all parts in the ISO 12643 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.

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Introduction

This document is a type-C standard as stated in ISO 12100:2010.

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

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organisations, market surveillance, etc.)

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

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e. g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers)

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

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

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

During the development of this document, existing relevant standards of other countries were taken into consideration. In cases where it was known that there is a national requirement that differs from this document, that has been noted.

The full set of requirements for graphic technology equipment and systems are those given in the part of ISO 12643 applicable to that type, together with the relevant requirements from ISO 12643-1:2023, to the extent specified in the Scope of the applicable part of ISO 12643.

This document supplements and modifies the general requirements of ISO 12643-1:2023. Where a requirement of this document conflicts with a requirement of ISO 12643-1:2023 the requirement of this document will take precedence.

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Graphic technology — Safety requirements for graphic technology equipment and systems —

Part 3: Binding and finishing equipment and systems

1 Scope

This document provides safety requirements specific to binding and finishing equipment and systems. It provides additional safety requirements for the design and construction of new equipment used to convert printed or blank substrates into cut, folded, collated, assembled, bound, or otherwise finished product.

This document is applicable to processes for preparing substrate for the printing process. It is also applicable to a wide range of equipment used in the binding and finishing process.

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 12643-1:2023, *Graphic technology — Safety requirements for graphic technology equipment and systems — Part 1: General requirements*

ISO 13849-1:2023, *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 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

ISO 14123-1:2015, *Safety of machinery — Reduction of risks to health resulting from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers*

ISO 14123-2:2015, *Safety of machinery — Reduction of risks to health resulting from hazardous substances emitted by machinery — Part 2: Methodology leading to verification procedures*

IEC 62061:2021, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12643-1:2023, ISO 13849-1:2023 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 <https://www.electropedia.org/>

**3.1
anti-repeat device**

mechanical or electromechanical mechanism that ensures that only one cutting cycle occurs for each manual activation or automatic cut if the primary stopping system or *single-cycle device* (3.30) fails

**3.2
automatic cutting sequence**

programmed succession of clamping operations and/or cutting movements that is initiated by the operator and proceeds to a specified point without further intervention by the operator

**3.3
back-rounding and pressing machine**

apparatus for processing book signatures, i.e. for rounding the spine and the trimmed front edge of book signatures and compressing the resulting signatures

**3.4
backgauge**

movable device (automatic or manual) on a guillotine cutter, positioned square to the cutting table, used to stop the stack of material to be cut when the material is pushed into the opening under the cutting blade by the operator, as well as to determine the dimensions of the cut

**3.5
backlining and head-banding machine**

<hard-cover bookbinding> equipment for the automatic production of hard-cover books where the binding together of the signatures is rounded or flat, with glue, gauze, or paper

**3.6
book-cover crease-forming machine**

<hard-cover bookbinding> apparatus for creating, under heat and pressure, a permanent bend in the cover of a hard-cover book, then pressing the entire cover surface

**3.7
book press**

device used for flattening books

**3.8
book signature press**

power-operated device used for flattening book signatures, which are fed and aligned manually

**3.9
casing-in machine**

<hard-cover bookbinding> apparatus for gluing the end papers of the book signatures to the interior surfaces of the book cover

**3.10
clamp bar**

device using pressure to secure product so that it does not move during an operation

**3.11
coater**

finishing machine that applies a predetermined thickness of a liquid substance (e.g. glue, varnish, ink) on substrates made of paper or a similar material

**3.12
counter-stacker**

machine for stacking piles of leaflets, books, magazines or newspapers such that the successive layers are positioned at 180° to the previous layer

3.13**cutting cycle**

<machines with a manually driven clamp bar> programmed succession of operations that begins when the knife drive is activated and ends when the knife returns to its retracted position

3.14**cutting cycle**

<machines with a power-driven clamp bar> programmed succession of operations that begins when high-pressure clamping is initiated and ends when the knife and *clamp bar* (3.10) return to their retracted positions after a single clamp bar/knife stroke

3.15**cutting zone**

three-dimensional space through which any part of the knife (knives) and/or *clamp bar(s)* (3.10) travels during the entire *cutting cycle* (3.14)

3.16**gang stitcher**

machine for stitching folded sheets of paper, during the operation in which individual folded sheets are removed by feeding grippers and the open sheets are stacked on top of each other on a transport chain for subsequent back-stitching

3.17**gathering machine**

apparatus that assembles sheets or folded sheets in a binding line

3.18**guillotine cutter**

power-driven machine having a single knife that is used primarily to cut paper products, stacks of paper, or other substrates, as specified by the manufacturer

3.19**high-pressure clamping**

operation of *clamp bar(s)* (3.10) with a dynamic force in excess of 300 N for machines up to and including 1,6 m in width, or in excess of 500 N for machines greater than 1,6 m in width, when measured at 75 % of the clamp bar opening (e.g. with the clamp bar at 25 % of its maximum travel distance measured from the retracted position).

Note 1 to entry: The 75 % value is to ensure that the measurement is made at the position that approximates to the size of an operator's hand.

3.20**inserting machine**

apparatus that inserts printed matter such as leaflets and magazines at a predetermined position in other printed products, such as newspapers or magazines

3.21**knife drive**

mechanism by which the knife of the guillotine is forced through the material to be cut

3.22**laminator**

paper-finishing machine that applies a solid material (e.g. foil, paper) to a substrate made of paper or a similar material

3.23

low-pressure clamping

<for machines with a power-driven clamp bar> operation of *clamp bar(s)* (3.10) with a dynamic force not exceeding 300 N for machines up to and including 1,6 m in width, or not exceeding 500 N for machines greater than 1,6 m in width, when measured at 75 % of the clamp bar opening (with the clamp bar at 25 % of its maximum travel measured from the retracted position)

Note 1 to entry: The 75 % value is to ensure that the measurement is made at the position that approximates to the size of an operator's hand.

3.24

manual clamping

operation of *clamp bar(s)* (3.10) in which the dynamic and static forces and motion of the clamp bar are directly supplied by the operator

3.25

paper drill

machine used to drill holes into piles of paper

3.26

paper-embossing machine

machine for finishing paper surfaces by using cylinders to press a design in relief into the paper

3.27

perfect binder

machine for the automatic production of brochures (soft-cover) or book signatures (hard-cover) where gathered folded sheets or single sheets are bound to form book or brochure signatures by applying glue on the pre-processed book back, and where book or brochure signatures are inserted into covers by gluing the cover on the back and/or sides

3.28

safety distance

minimum distance a protective device is required to be placed from a hazard zone

3.29

sheet-folding machine

apparatus to cut, perforate and/or crease single or multiple folds in single sheets of paper

3.30

single-cycle device

mechanism that ensures that only one cutting cycle occurs for each manual activation or automatic cut

Note 1 to entry: See *anti-repeat device* (3.1).

3.31

stored energy

potential energy that can be released without actuation of the machine drive or controls

4 Significant hazards

The list of significant hazards covered in this document is given in [Annex B](#).

5 Guarding of significant hazards

5.1 General

Guarding, consistent with operation of the machine, shall be provided in those areas where it is recognized that operators are exposed to significant hazards. The guarding requirements of ISO 12643-1:2023 apply.

Binding and finishing equipment and systems conforms with the requirements of ISO 12643-1:2023 as far as not modified or replaced by the requirements of this document.

5.2 Interlocks

5.2.1 Interlocking with guard locking

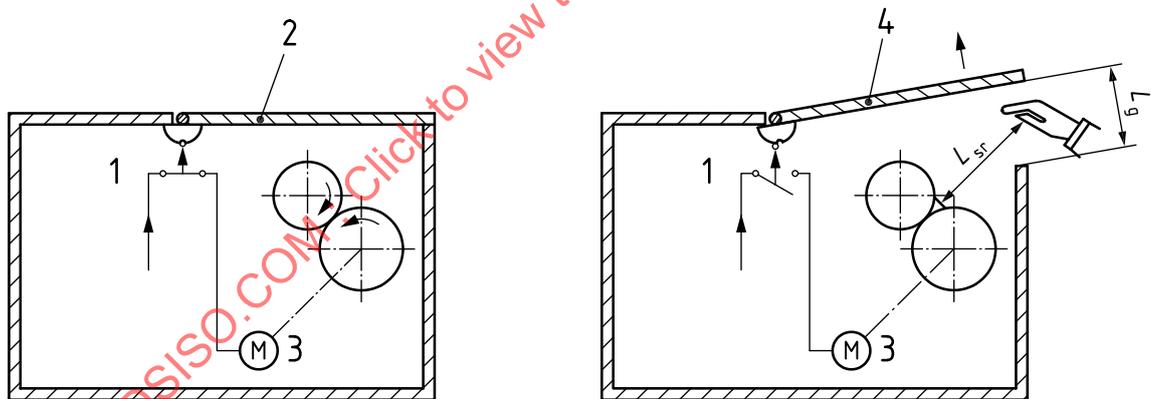
Interlocking guards shall be designed so that the sensor (interlock) shall be activated within the limits specified in Table 1, depending on the distance to the hazard. Otherwise, guard locking shall be utilized.

Interlocking with guard locking is also required where the hazardous movement cannot be stopped in 10 s or less after actuation of the position detector.

Table 1 — Requirements for interlocking guards without guard locking

Safety distance ^a , L_{sr} , between guard opening and hazard point mm	Maximum opening ^a , L_g , of the guard while the detector changes its state mm
<80	≤30
≥80 and <500	≤40
≥500 and <850	≤80
≥850	≤160

^a See Figure 1 for location of the measurements.



a) Motor running

b) Motor stopped

Key

- 1 failsafe limit switch
- 2 guard closed
- 3 motor
- 4 guard open
- L_{sr} safety distance
- L_g maximum opening

Figure 1 — Distances related to requirements for guard locking

5.2.2 Exception for machine motion at inching speed

If a machine is operating at inching speed and under conditions defined in ISO 12643-1:2023, 5.3.6, motion may continue when an interlocked guard is opened.

5.2.3 Exception for machine motion at production speed

This exception shall apply only to the specific machines identified in this document and does not apply to all equipment.

There might be parts of the equipment that cannot be observed or adjusted with the guard closed and need to be accessed by an authorized person with an interlocked guard open. Under these circumstances, the following alternative safety measures shall be taken.

- a) A mechanical key lock shall be provided adjacent to the access area. There shall be only one key for this lock. The key for this lock shall be accessible only by an authorized person.
- b) The key lock shall operate as a hold-to-run device as follows:
 - 1) inserting the key shall initiate a timer that has a maximum setting of 2 min;
 - 2) turning the key shall override the guard interlock of only that guard, up to the preset time limit;
 - 3) as long as the key is held in the turned position, the guard may be opened with machine motion at production speed until such time as the timer reaches the preset time limit;
 - 4) when the key is released, it shall automatically return to the neutral position and the guard interlock shall be automatically reactivated;
 - 5) if the key remains in the lock for a period longer than the preset time limit (which shall not exceed 2 min), the interlock on the guard shall be reactivated automatically and the equipment safety system shall stop machine motion.
- c) The bypassing means shall be in accordance with at least ISO 13849-1:2023, PL d or IEC 62061:2021, SIL 2.
- d) When adjustments are necessary, they shall be performed from outside the hazardous area.
- e) A safety sign identifying the possible existing hazards with the guard open shall be provided adjacent to the lock. The label shall clearly indicate that, when the key is in the lock, the adjacent guard is overridden.

If a machine is equipped with this alternative safety measure, information regarding its safe use shall be contained in the instruction handbook.

5.3 Guarding of hoppers and hopper feeders

5.3.1 Manually loaded hoppers

On machines using manually loaded hoppers, the hazard points on the separating elements of the hopper feeder shall be safeguarded in accordance with [5.3.4](#). The exception defined in [5.2.2](#) can be applied to the hopper feeder, if necessary.

5.3.2 Guarding of automatically fed hoppers

On automatically fed hoppers where manual intervention during normal operation is not required and the material used makes access difficult, tunnel-type guards arranged with a safety distance of 550 mm from the nearest hazard point are considered adequate.

The exception defined in [5.2.2](#) can be applied to the hopper feeder, if necessary.

5.3.3 Protection of unused hoppers and hopper feeders

For hoppers that are not used and cannot be stopped, blanking boards shall be provided to safeguard the hazard points at the separating elements.

5.3.4 Separating elements on hopper feeders

The hazard points on separating elements outside the sidelays on feeders shall be safeguarded for every format size used.

NOTE This safeguarding can be achieved, for example, by using accordion-type bellows or by the use of additional guards.

For hazard points within sidelays, the residual pile monitoring shall be used as a safety device.

Measures for fault detection [diagnostic coverage DC] and to prevent manipulation of the safety device are required.

5.4 Guarding on binding and finishing machines

5.4.1 Hand-fed riveting, eyeletting and attaching machines

Hazard points between tools on riveting, eyeletting and attaching machines either shall be prevented by design or shall be safeguarded.

Means to satisfy this requirement include, but are not limited to, the following:

- observing a maximum distance of 4 mm between the tools in the open position;
- ensuring that the closing force of the movable tool is less than 50 N; a stronger closing force is allowed to become effective only after a sensing device has confirmed that no part of a human body is located between the two tools. The control system shall satisfy the requirements of ISO 12643-1:2023, 5.10.1.2.

NOTE The sensing device function, for example, can be based on the fact that the workpiece and a body part have different electrical resistances or different thicknesses.

Hazard points are safeguarded if guards are provided in accordance with ISO 13857:2019 or the machine can be started only by two-hand control.

For machines that are not guarded by a fixed or movable guard, a workpiece support shall be provided, and two-hand controls meeting the requirements of ISO 12643-1:2023 shall be used. If the workpiece needs to be held by hand outside the hazard zone, a hold-to-run control shall be provided for starting the machine instead of the two-hand control.

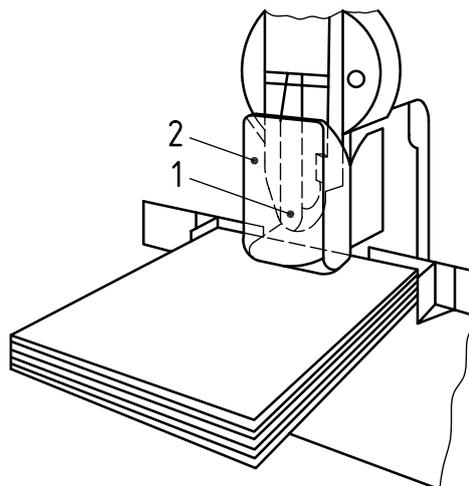
5.4.2 Hand-fed flat- and saddle-stitching machines

Adjustable guards shall be provided on flat-stitching, saddle-stitching and combination-stitching machines for operational reasons (see [Figure 2](#) and [Figure 3](#)). Instructions that describe the safe adjustment of the guards in a clear and easily understandable format shall be provided on the machine.

NOTE This marking requirement is satisfied, for example, by providing safety signs that illustrate the safety distances required for the various stitching thicknesses by means of sketches and measurements.

On combination-stitching machines in the saddle-stitching mode, the guard for the upper tool shall extend to the height of the upper edge of the lower tool (upper edge of the saddle) and shall enclose the upper tool to prevent inadvertent access (see [Figure 3](#)).

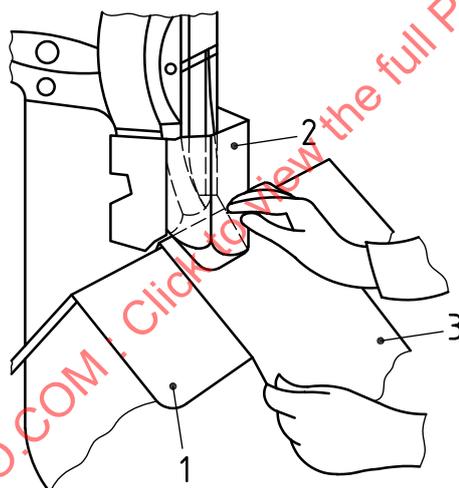
Guarding can be by either two separate guards or a combined reversible guard. Combined reversible guards shall be suitable for saddle stitching as well as for flat stitching.



Key

- 1 upper tool
- 2 guard

Figure 2 — Flat stitcher



Key

- 1 upper edge of saddle
- 2 guard
- 3 workpiece

Figure 3 — Saddle stitcher

5.4.3 Gang stitchers and drum stitchers

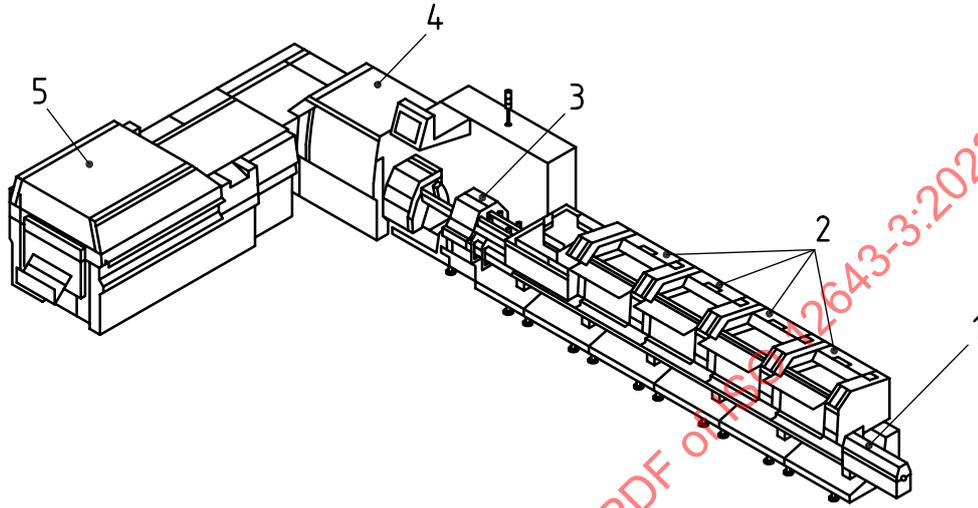
5.4.3.1 Feeders on gang stitchers and drum stitchers

Depending on the design, fixed guards, movable guards, residual-pile monitoring or other means of guarding shall be used (see [Figure 4](#)).

Where the bottom of the feeder on the transport chain side (see [Figure 5](#)) needs to remain open for functional reasons, the lower edges of the guards on the transport chain side shall be extended as low as technically feasible.

EXAMPLE An example of a “functional reason” would be for the building of air vortices.

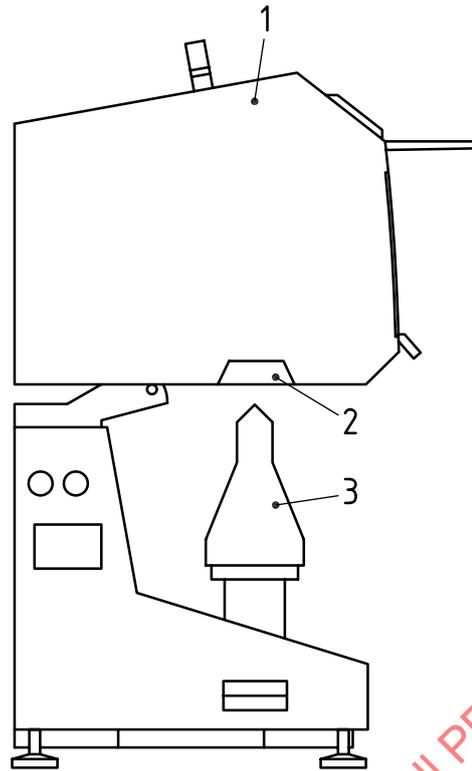
The exception defined in [5.2.2](#) may be applied to the feeder, if necessary.



Key

- 1 transport chain
- 2 feeder
- 3 thickness control
- 4 stitching unit
- 5 trimmer

Figure 4 — Gang stitcher



Key

- 1 hopper
- 2 bottom of feeder
- 3 transport chain

Figure 5 — Feeder

5.4.3.2 Guarding stitching section of gang stitchers

Hazard points on the stitching section shall be safeguarded by interlocked guards on the operator's side. The other side shall be guarded in accordance with ISO 12643-1:2023. Guard apertures shall be in accordance with ISO 13857:2019.

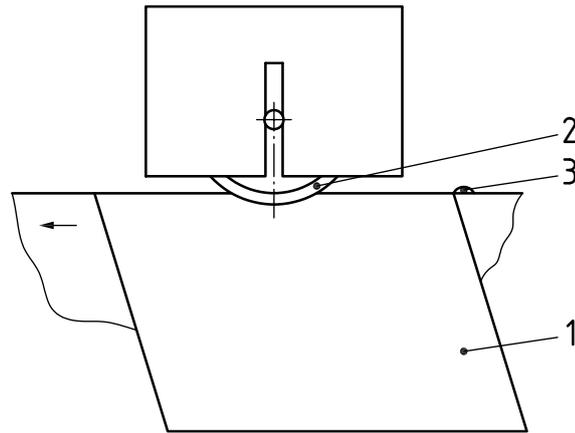
The transport pins shall be made of a flexible material to prevent a shearing hazard against the guard.

5.4.3.3 Caliper roll

Where an in-running nip exists on the caliper roll used for thickness control (see [Figure 6](#)), one or both of the following means of protection shall be used:

- maximum clamping force of 50 N with roller deflection at 20 mm;
- guarding in accordance with ISO 12643-1:2023.

The pins/carrier elements on the transport chain shall be made of a flexible material to prevent a shearing hazard against the guard.



Key

- 1 folded sheets
- 2 in-running nip of caliper roll
- 3 transport chain with pins/carrier elements

Figure 6 — Caliper roll for thickness control

5.4.3.4 Transport-chain pushers on gang stitchers

A safety distance of at least 25 mm shall be maintained between transport-chain pins/carrier elements and fixed machine parts.

5.4.3.5 Starting gang stitchers and drum stitchers with a guard open

As an exception to ISO 12643-1:2023, 5.3.6, machine motion at a speed greater than 10 m/min is allowed by means of two-handed control for make-ready of gang stitchers and drum stitchers with interlocking guards in the open position and, provided that other requirements of ISO 12643-1:2023, 5.3.6 are met. The speed shall be as low as possible under procedural requirements.

5.4.3.6 Trimmer on gang stitchers and drum stitchers

The trimmer on gang stitchers and drum stitchers shall be safeguarded in accordance with [5.10](#).

5.4.4 Gathering machines

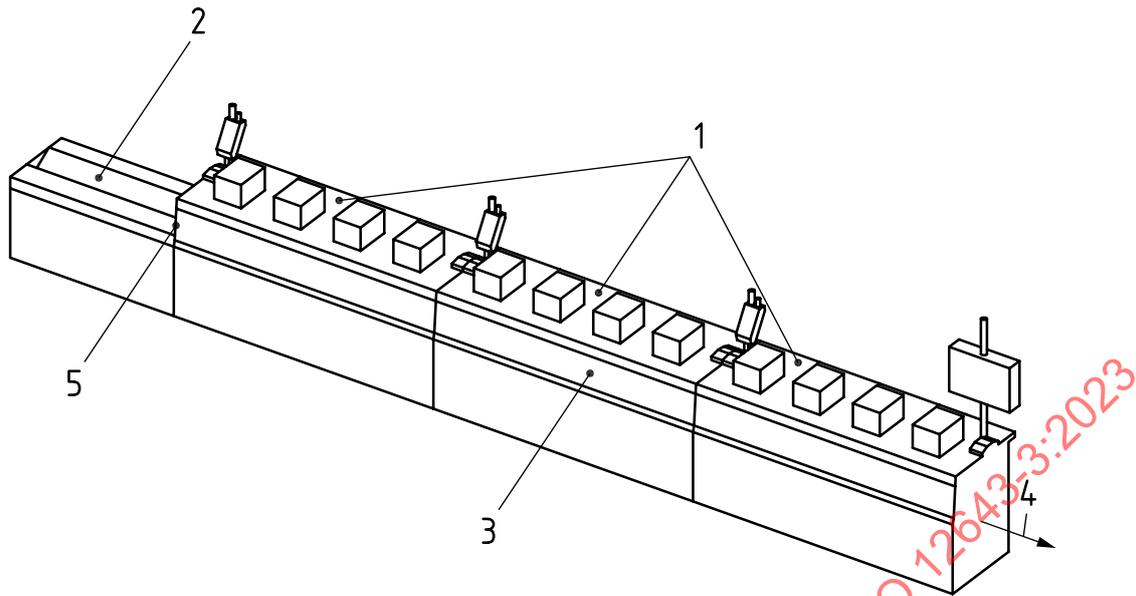
5.4.4.1 General

Gathering machines shall be guarded in accordance with [5.4.4.2](#) and [5.4.4.3](#). The exception defined in [5.2.2](#) can be applied, if necessary.

5.4.4.2 Guarding transport chains

For safeguarding the hazard points on the manual feeding unit, a minimum distance of 25 mm is required between the transport chain and fixed machine parts. Where the minimum distance cannot be achieved and maintained, trip bars meeting the requirements of ISO 12643-1:2023 may be used for safeguarding. Hazard points that can be reached from the manual feeding section in the following feeder shall be safeguarded by fixed or interlocking tunnel-type guards (see [Figure 7](#)) having a minimum length of 300 mm.

Hazard points on the gathering device (transport device) shall be safeguarded by fixed or interlocking guards.



Key

- 1 hopper
- 2 manual feeding
- 3 gathering device (transport device)
- 4 following machines
- 5 tunnel guard

Figure 7 — Gathering machine (plan view)

5.4.4.3 Starting gathering machines with a guard open

As an exception to ISO 12643-1:2023, 5.3.6, machine motion at a speed greater than 10 m/min is allowed by means of two-handed control for make-ready of gathering machines with interlocking guards in the open position and, provided that other requirements of ISO 12643-1:2023, 5.3.6 are met. The speed shall be as low as possible under procedural requirements.

5.4.4.4 Feeder

When feeding manually, the hazardous zones of the separating elements of the feeder shall be safeguarded in accordance with ISO 12643-1:2023, 5.3.10.5.

For hazard points within sidelays, the residual pile monitoring shall be used as a safety device.

Measures for fault detection [diagnostic coverage (DC)] and to prevent manipulation of the safety device are required.

5.4.4.5 Feeding section

For feeding sections that are not used and cannot be stopped, blanking boards of maximum format size shall be provided to safeguard the hazardous zones at the separating elements instead of the blanks. These boards shall ensure that the machine is not stopped by the residual pile monitoring system.

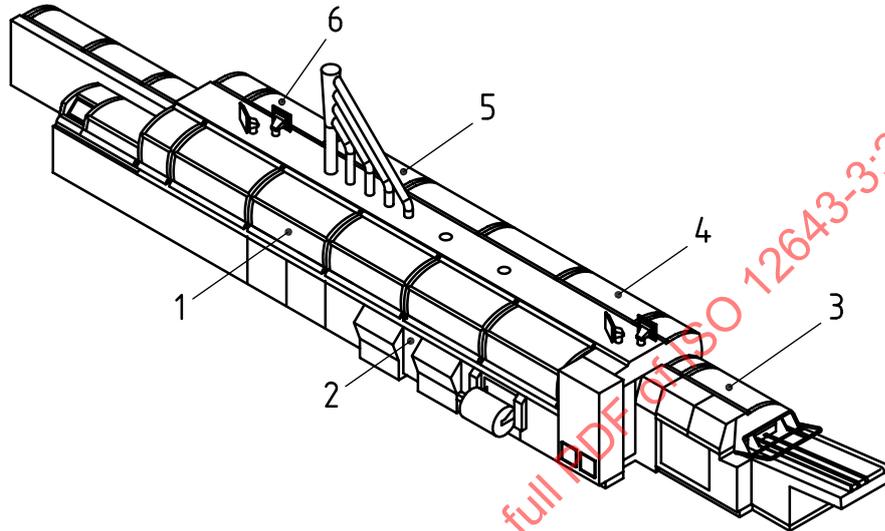
5.4.4.6 Emergency stop system

An emergency stop device shall be provided. Additional emergency stop devices or stop/safe pushbuttons shall be provided on each main control panel and a maximum distance of 5 m apart.

5.4.5 Perfect binders

5.4.5.1 Guarding book carriage hazards

The hazard points existing between book carriages and between the book carriage and the machine frame, as well as during cover pressing, shall be guarded in accordance with ISO 12643-1:2023. Depending upon the design, fixed guards, movable guards or other means of guarding can be used (see [Figure 8](#)).



Key

1	milling unit	4	pressing unit
2	gluing unit	5	book carriage
3	cover feeder	6	delivery

Figure 8 — Perfect binder (plan view)

5.4.5.2 Hazards in the gluing unit

Guarding in accordance with ISO 12643-1:2023 shall be provided to protect personnel from hot glue spray, both during production and when routinely accessing other nearby areas. The guards adjacent to the hot glue mechanism shall be interlocked so that the hot glue spray mechanism is deactivated when the guard is open.

5.4.5.3 Glue pans

The glue pans for hot-melt shall be provided with a temperature control and maximum-temperature monitoring. The temperature control system shall be in accordance with at least ISO 13849-1:2023, PL b or IEC 62061:2021, SIL 1. The maximum-temperature monitoring shall be in accordance with at least ISO 13849-1:2023, PL b or IEC 62061:2021, SIL 1. The temperature control and maximum-temperature monitoring shall be implemented in separate standard control systems. Any hazardous hot-melt vapour shall be exhausted both from the perfect binder and from outside the machine for pre-melters, unless protection from exposure to the vapour is provided by other means.

Perfect binders using polyurethane hot-melt glues for binding shall be designed such that the machine does not emit hazardous concentrations of isocyanates, or that these are removed by an exhaust system. The requirements of ISO 14123-1:2015 and ISO 14123-2:2015 shall be met.

The monitoring of the exhaust system (hot-melt/polyurethane hot-melt) shall be in accordance with at least ISO 13849-1:2023, PL b or IEC 62061:2021, SIL 1.

The specific requirements for extraction equipment shall be a function of the type of glue applied. Special consideration shall be given to the design of the gluing unit (ducts, spray nozzles) and the size and layout of the perfect binder. The exhaust air shall be discharged without risk to the environment.

Where filter systems are used with the exhaust air recirculating to the inside, their efficiency shall be proved by measuring the contents of isocyanate vapours and aerosols in order to make sure that the surrounding air does not contain harmful levels of such substances.

For further information in the instruction handbook and residual risks when handling polyurethane, see [7.3](#).

Contact with hot surfaces above 65 °C of the hot-melt pan shall be prevented by guarding or by insulation.

Where hot parts above 65 °C are accessible after the interlocking guards have been opened, safety signs shall be provided.

For further information on hot parts, see [7.11](#).

5.4.5.4 Cover feeder

A residual pile monitoring device shall be provided.

Where the machine operates with automatic feeding, and routine and regular manual intervention is not required, tunnel-type guards with a safety distance of at least 550 mm from the nearest hazard point are considered adequate.

5.4.5.5 Delivery area

It shall be ensured that the book-carriage (book clamp) hazards of the delivery of the perfect binder cannot be accessed. The safety distance from the book clamp hazard to the guard shall be a minimum of 550 mm.

5.4.5.6 Starting perfect binders with a guard open

Perfect binders may be started for make-ready by means of a two-hand control with one or more interlocking guards in the open position and machine motion at a speed greater than 10 m/min, provided that the requirements of the exception to ISO 12643-1:2023, 5.3.6, are met.

Where functional circumstances require the book cover to be fed manually during set-up of the perfect binder, the machine may be started when one or more interlocking guards are in the open position with a hold-to-run control and a maximum speed of 10 m/min.

For further information, see [7.3](#).

5.4.5.7 Milling head cutter (saw)

On high-speed binding lines, where inertia can prevent effective stopping of the milling-head cutter when the interlocking guard covering the book carriages (book clamps) is opened, access to the hazardous motion shall be prevented until the motion has stopped.

If circumstances during production prevent the milling head cutter from stopping when the interlocking guard covering the book clamp is opened, the following measures shall be taken:

- access to the milling head cutter shall be prevented as much as possible by additional guards (for example: moveable guards over the milling head cutters than can be pushed open, vertical guards in front of the milling head knives);
- a safety sign shall be placed in the vicinity of the milling head cutter.

For further information, see [7.3](#) in the instruction handbook.

The monitoring of the exhaust (paper shavings/dust) shall be in accordance with at least ISO 13849-1:2023, PL b or IEC 62061:2021, SIL1.

5.4.5.8 Additional requirements for hand-fed perfect binders

Where there is a risk of injury if the operator's hand goes beyond the book clamp loading area, the hazard shall be protected by a trip device or electro-sensitive protective device (light curtain) that will stop machine motion. The control system shall satisfy the requirements of ISO 12643-1:2023, 5.10.1.2.

The cover-scoring blades shall be guarded with fixed or interlocking guards.

The milling-head cutter shall be protected against unintended access by the use of self-adjusting plates that open to allow a book block to pass over the saw, then automatically close.

5.4.5.9 Emergency stop

An emergency stop device shall be provided. Additional emergency stop devices or stop/safe pushbuttons shall be provided on each main control panel and a maximum distance of 5 m apart.

5.4.6 Paper drills

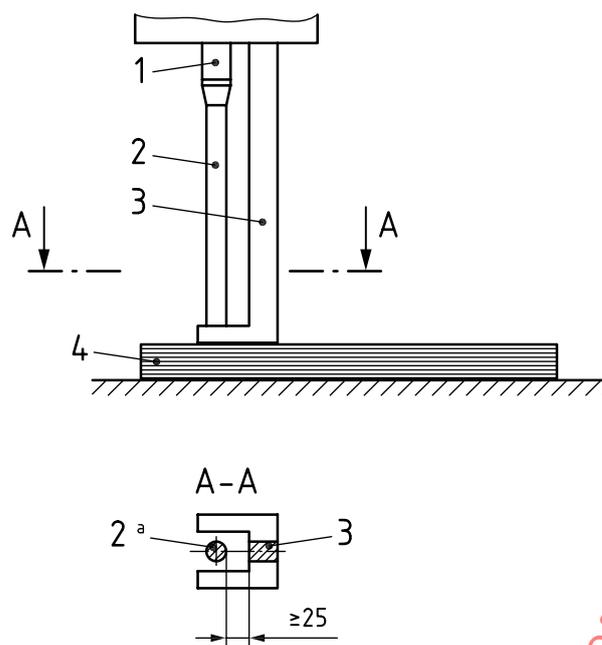
5.4.6.1 Single-head hand-fed paper drills

On single-head paper drills with manual feeding, the stroke of the drill or workpiece shall be under hold-to-run control (hand-controlled or foot-controlled) or shall be hand-operated. In addition, a hold-down device (see [Figure 9](#) and [Figure 10](#)) shall be provided on the drill in order to prevent persons from coming into unintentional contact with the drill from the front. When the hold-to-run control is released, the drill or workpiece shall return to its start position.

The minimum distance between the hold-down device and the chuck jaw or the drill, whichever has the larger radius, shall be 25 mm (see [Figure 9](#)).

5.4.6.2 Guarding the trapping hazard on multi-head drilling machines

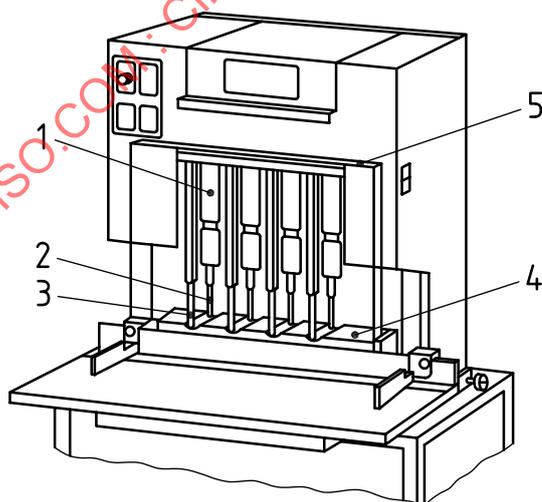
On multi-head drilling machines, the trapping hazard existing on drills and chuck jaws shall be safeguarded by a fixed or interlocking guard. On multi-drill machines, hazard points on the chuck jaws shall be protected by the use of fixed or interlocking guards. The minimum distance between the hold-down device or guard (cover) and the chuck jaw or the drill, whichever has the larger radius, shall be 25 mm.



Key

- 1 chuck jaw
- 2 drill
- 3 hold-down device
- 4 material
- ^a Indicates the chuck jaw or the drill, whichever has the larger radius.

Figure 9 — Paper drill



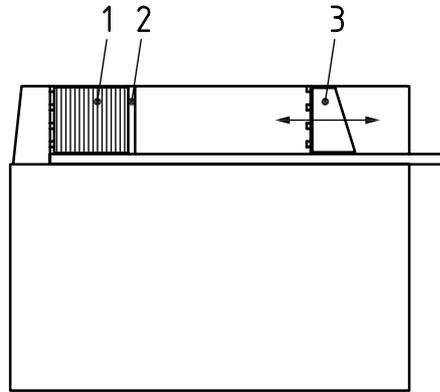
Key

- 1 chuck jaw
- 2 drill
- 3 hold-down device
- 4 material
- 5 guard (cover)

Figure 10 — Multi-head paper drill

5.4.7 Book signature presses

On book signature presses, the hazard point between the moving pressing plate and the intermediate plate positioned against the material supply (see [Figure 11](#)) shall be safeguarded by using a hold-to-run control.



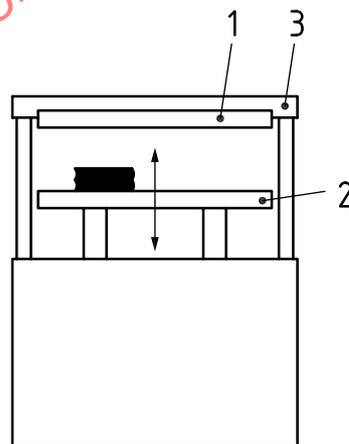
Key

- 1 book signatures
- 2 intermediate plate
- 3 pressing plate

Figure 11 — Book signature press

5.4.8 Book press

The hazard points between the movable pressing plate and the fixed pressing plate or the forming bar (see [Figure 12](#)), if any, shall be safeguarded. One means of safeguarding this area is by use of a trip device in accordance with ISO 12643-1:2023.



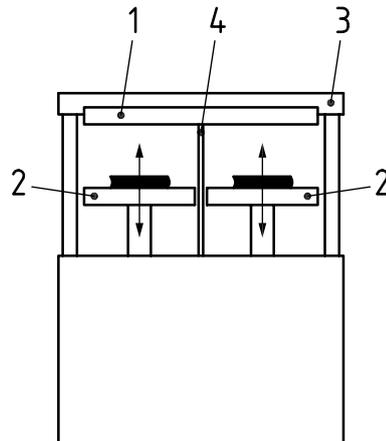
Key

- 1 trip device
- 2 movable pressing plate
- 3 fixed pressing plate

Figure 12 — Book press

On book presses where several pressing plates can be moved individually, the hazard points between the movable pressing plates shall be safeguarded. One means of safeguarding this area is by fitting a guard between the pressing plates (see [Figure 13](#)).

If the hazard is safeguarded by fitting a guard between the pressing plates, clearance between the guard and moving pressing plates shall not exceed 6 mm.



Key

- 1 trip device
- 2 movable pressing plate
- 3 fixed pressing plate
- 4 guard

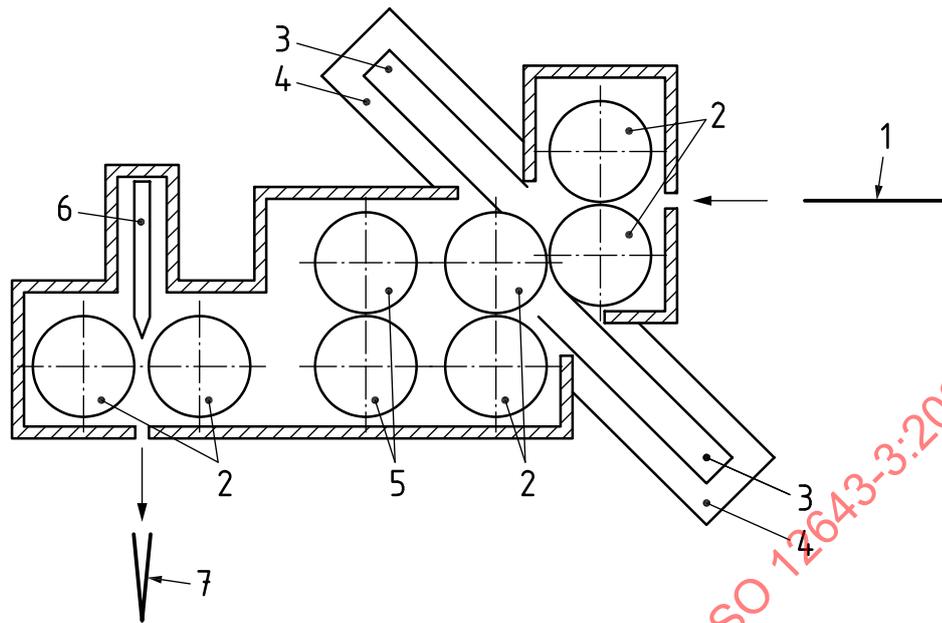
Figure 13 — Book press with two movable pressing plates

5.4.9 Sheet-folding machines

5.4.9.1 Guarding hazard points at the folding rollers

The hazard points at the folding rollers shall be protected by fixed or interlocking guards. Adjustments shall be made from outside the guards. Safeguarding can also be accomplished by using a device with a guarding function.

NOTE An example of a safeguarding device is a buckle plate, as shown in [Figure 14](#).

**Key**

1	unfolded sheet	5	cutting and creasing device
2	folding roller	6	folding knife
3	buckle plate	7	folded sheet
4	sound enclosure		

Figure 14 — Sheet-folding machine**5.4.9.2 Machine motion with a guard open**

When interlocked guards are in the open position, the machine may be operated by two-hand control at production speed as long as the requirements of ISO 12643-1:2023, 5.3.6, are met, with the further exception that a selector switch is not required.

NOTE The selector switch is not necessary because a sheet-folding machine is operated in a single mode by one person.

5.4.10 Book production lines for the production of hard-cover books**5.4.10.1 General**

Book production lines may be started for make-ready with interlocking guards in the open position by means of a two-hand control and machine motion at a speed no greater than 20 m/min, provided that the requirements of the exception to ISO 12643-1:2023, 5.3.6 are met.

NOTE Hold-to-run control speeds in production lines differ due to cycle variations so that a continuous machine speed can result in individual devices having higher speeds at the various stages of the process.

5.4.10.2 Safeguarding hazard points in glue sections

Where hot-melt is used, the hot-melt pans shall be provided with temperature control and limit-temperature monitoring.

The temperature control system shall be in accordance with at least ISO 13849-1:2023, PL b or IEC 62061:2021, SIL 1. The maximum temperature monitoring shall be in accordance with at least

ISO 13849-1:2023, PL b or IEC 62061:2021, SIL 1. The temperature control and maximum-temperature monitoring shall be implemented in separate control systems.

EXAMPLE 1 Hazard points might exist, for example, at in-running nips between glue rollers and at in-running nips between book signatures and glue rollers.

EXAMPLE 2 Safe glue replenishment might be provided, for example, by a piping system or by a method of replenishment from outside the safety devices.

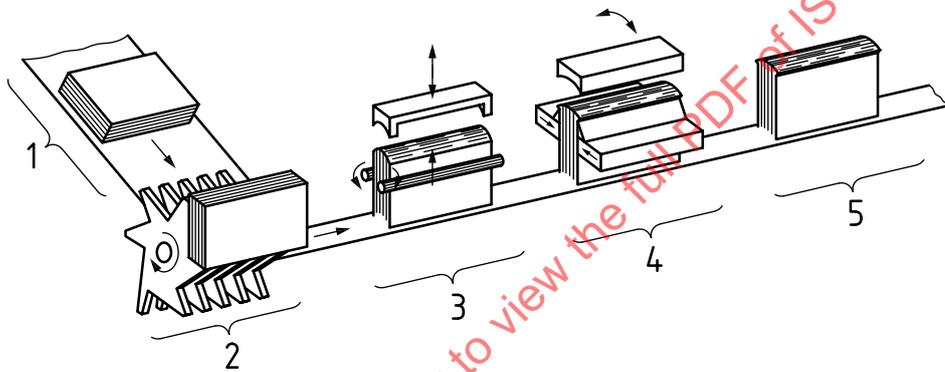
5.4.11 Back-rounding and pressing machines

5.4.11.1 Safeguarding in-running nips on feed and delivery belts

A safety distance of at least 550 mm between the conveyor belt and any hazard point inside the machine shall be maintained unless the hazard point is guarded by a fixed or interlocking guard.

5.4.11.2 Safeguarding hazard points on tipping section

Hazard points in the tipping section (see [Figure 15](#)) shall be protected by fixed or interlocking guards.



Key

- 1 feeding of book signatures
- 2 tipping of book signatures
- 3 pre-forming section
- 4 back-rounding and pressing section
- 5 delivery

Figure 15 — Back-rounding and pressing section (principle)

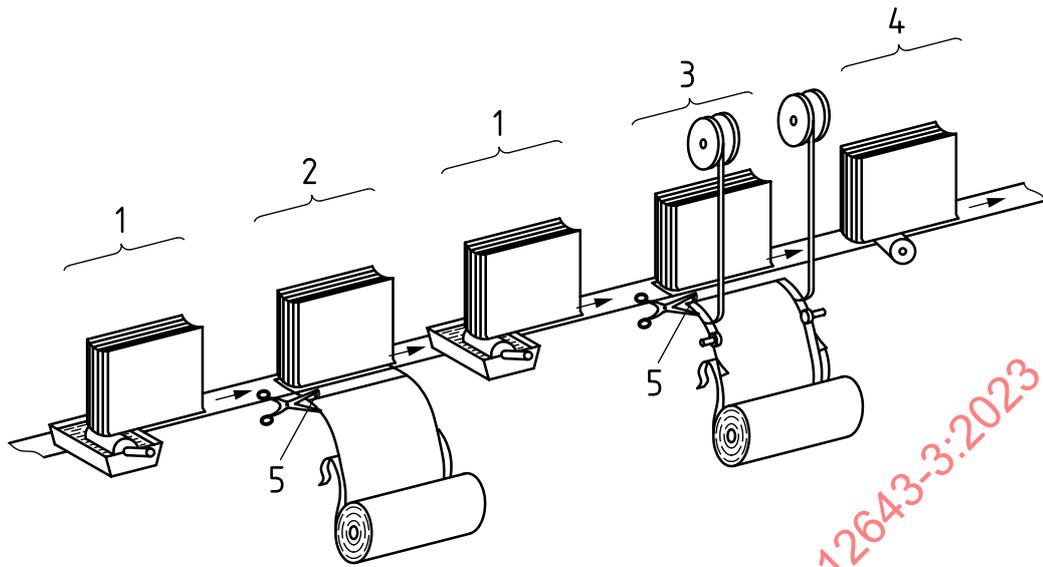
5.4.11.3 Safeguarding hazard points on pre-forming, back-rounding and pressing sections

Hazard points in the pre-forming, back-rounding and pressing sections (see [Figure 15](#)) shall be protected by fixed or interlocking guards.

5.4.12 Backlining and head-banding machines

5.4.12.1 Safeguarding in-running nips

Where book signatures are transported between vertically mounted conveyor belts, the in-running nip between the two conveyor belts on the feeding side shall be safeguarded by a tunnel-type guard at least 550 mm long.

**Key**

- 1 glue section
- 2 gauzing section
- 3 head-banding section
- 4 counter-pressure section
- 5 cutting point

Figure 16 — Backlining and head-banding machine (principle)

5.4.12.2 Safeguarding gauze section hazards

The cutting point in the gauzing section (see [Figure 16](#)) shall be protected.

5.4.12.3 Safeguarding head-banding section hazards

The hazard points inside the head-banding section (see [Figure 16](#)) and the cutting points at the cutting knives and at the rotary knives on the unwinding unit of the head-banding section shall be protected by fixed or interlocking guards.

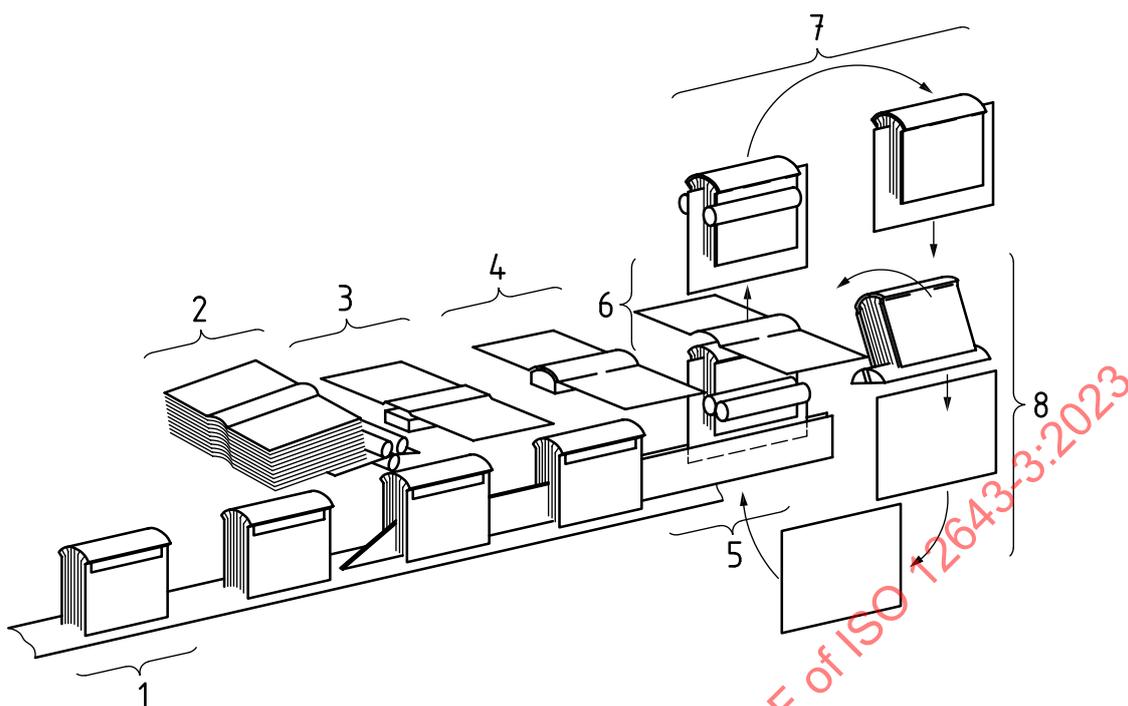
5.4.12.4 Safeguarding counter-pressure section hazards

The hazard points at the counter-pressure sections (see [Figure 16](#)) shall be protected by fixed or interlocking guards.

5.4.13 Casing-in (case-binding) machines

5.4.13.1 Safeguarding hazard points between book transport and fixed machine parts

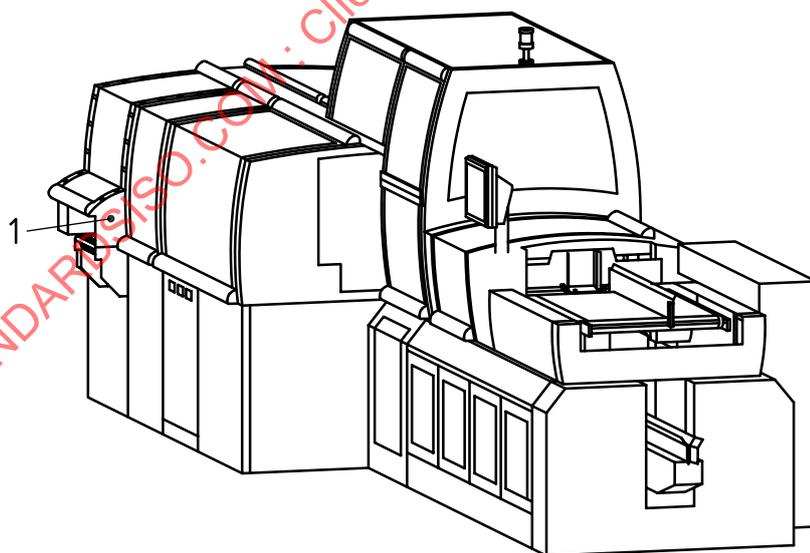
A safety distance of at least 550 mm between the book-transport fingers and fixed parts of the machine shall be maintained unless the hazard point is guarded by a fixed or interlocking guard. See [Figure 17](#) and [Figure 18](#).



Key

- | | | | |
|---|-----------------------|---|--------------------------|
| 1 | feeding | 5 | gluing section |
| 2 | book cover feeder | 6 | casing-in section |
| 3 | cover bending section | 7 | counter-pressure section |
| 4 | forming section | 8 | delivery |

Figure 17 — Casing-in machine (principle)



Key

- | | |
|---|-------------------|
| 1 | tunnel-type guard |
|---|-------------------|

Figure 18 — Casing-in machine showing tunnel-type guard

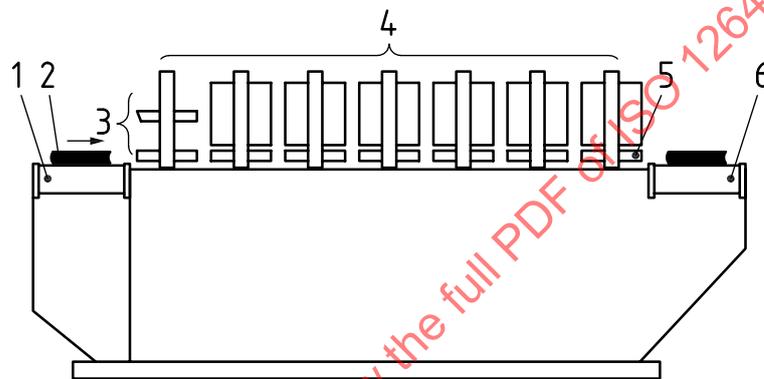
5.4.13.2 Safeguarding hazard points at delivery

Figure 18 shows an example of the use of a tunnel guard to safeguard the hazard points at delivery. Hazard points inside the machine shall not be accessible from the delivery side. A safety distance of at least 550 mm between the hazard and the open end of the guard nearest the hazard shall be maintained unless the hazard point is guarded by a fixed or interlocking guard.

5.4.14 Book-cover crease-forming machines (presses)

5.4.14.1 Safeguarding in-running nips, tipping section and pressing section

It shall not be possible for a person to reach a hazard point inside the machine from the delivery (see Figure 19). A safety distance of at least 550 mm between the hazard and the open end of the guard nearest the hazard shall be maintained unless the hazard point is guarded by a fixed or interlocking guard.



Key

1	feeding belt	4	pressing section
2	book signature	5	crease-forming rail
3	tipping section	6	delivery belt

Figure 19 — Book-cover crease-forming machine (press)

5.4.14.2 Motion with a guard open

Book-cover crease-forming machines may be started for make-ready by means of a two-hand control with interlocking guards in the open position and machine motion at a speed greater than 10 m/min but no more than 20 m/min, provided that the requirements of the exception to ISO 12643-1:2023, 5.3.6, are met.

NOTE A hold-to-run speed greater than 10 m/min might be needed to ensure that the book in the machine does not burn during the glue melting process at the crease-forming rail.

5.5 Inserting and collating machines

Machines with automatic feeders may be started for make-ready by means of a two-hand control with interlocking guards in the open position and machine motion at a speed greater than 10 m/min, provided that the requirements of ISO 12643-1:2023, 5.3.6, are met.

5.6 Counter-stackers

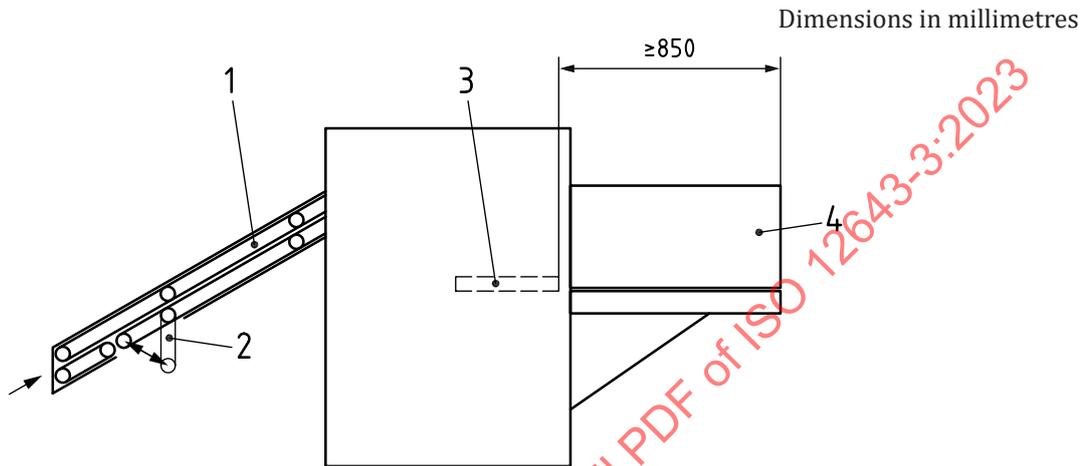
5.6.1 Safeguarding divert gates (waste separator)

The crushing point on the divert gate (see Figure 20) shall be safeguarded.

5.6.2 Safeguarding hazard points at turntable

At least one side of the turntable shall be protected by an interlocking guard in order to allow access for the removal of jams.

On the side where the stacked material is delivered, access to the turntable shall be prevented by a fixed or interlocked tunnel-type guard, or other means of safeguarding. If a fixed or interlocked tunnel-type guard is used, the safety distance from the open end of the tunnel guard to the hazard point shall be at least 850 mm (see [Figure 20](#)).



Key

- 1 feeding belt
- 2 divert gate
- 3 turntable
- 4 delivery tunnel with delivery belt

Figure 20 — Counter-stacker

5.6.3 Pneumatic system

When an interlocking guard is opened or the emergency stop device is activated, the pneumatic system of the counter-stacker, including any accumulators, shall be depressurized in order to prevent inadvertent hazardous movement of the counter-stacker.

5.7 Paper-embossing machines

5.7.1 Safeguarding in-running nips on guide rollers

The in-running nips between guide rollers and between guide rollers and fixed machine parts shall be safeguarded by providing a minimum separation of 120 mm, or by fixed or interlocking guards.

NOTE For an example for paper-embossing machines, see [Figure 21](#).

5.7.2 Stretch rollers and counter rollers

Stretch rollers and counter rollers shall have a minimum separation of 120 mm (clearance between the two rollers).

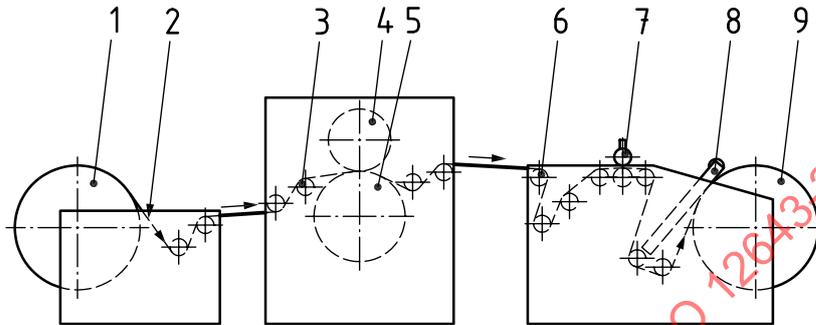
5.7.3 Safeguarding movement of counter roller

The movement of the counter roller when travelling into and out of position shall be safeguarded.

If speed limitation is used as the safeguard, movement of the counter roller shall be limited to 5 m/min under hold-to-run, or to a speed of less than 0,5 m/min.

5.7.4 Insulation of heated parts

Hot pipes shall have adequate insulation up to a height of 2,7 m above the operator platform. In the case where the operator is standing on the floor, rather than on a raised platform, the floor is considered to be the “platform” for this requirement.



Key

1	unwinding unit	6	guide rollers
2	paper web	7	cutting unit
3	stretch roller	8	drive roller
4	embossing roller	9	rewinding unit
5	counter roller		

Figure 21 — Paper-embossing machine

5.8 Finishing machines

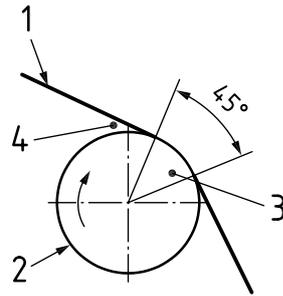
5.8.1 Coaters

5.8.1.1 Safeguarding in-running nips

The in-running nip between guide rollers and between guide rollers and fixed machine parts shall be safeguarded by providing a minimum separation of 120 mm, or by fixed or interlocking guards.

The in-running nips between the coated, tear-resistant material web and guide rollers that can be accessed in the machine from passageways and that have a wrapping angle of 45° or more (see [Figure 22](#)) shall be protected by fixed guards.

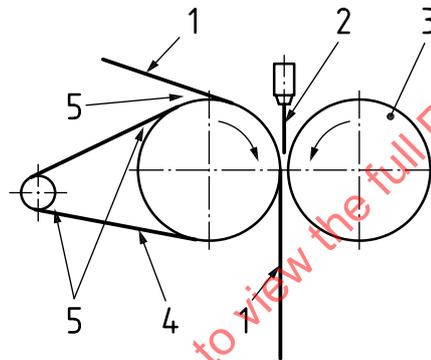
The in-running nips on the polytetrafluoroethylene (PTFE) belt (see [Figure 23](#)) shall be safeguarded.



Key

- 1 coated web
- 2 guide roller
- 3 wrapping angle
- 4 in-running nip

Figure 22 — Wrapping angle on guide rollers



Key

- 1 material web
- 2 polyethylene (PE)
- 3 cooling roller
- 4 polytetrafluoroethylene (PTFE) belt
- 5 nip point

Figure 23 — Coating with polyethylene

5.8.1.2 Explosion prevention

For examples of explosion zones for electrical apparatus, see ISO 12643-1:2023, Annex F.

5.8.1.3 Continuous-flow dryers on coating devices

5.8.1.3.1 Flammable substances

Where coating material that can emit flammable substances is being used during the drying process, measures shall be taken to prevent the ignition of the vaporised substances.

NOTE 1 For example, in the United States, NFPA 86^[4] and in the EU EN1539:2015 applies.

NOTE 2 Requirements relating fire and explosion prevention differ from region to region. National requirements can apply.

5.8.1.3.2 Safeguarding hazard points on dryers

The hazard points created when closing the upper and the lower part of the dryer shall be safeguarded.

NOTE 1 This safeguarding can be achieved, for example, by hold-to-run control.

The automatic closing movement of the dryer shall be safeguarded. Automatic closing shall be possible only for the last 300 mm of the aperture.

NOTE 2 Examples of safeguarding methods include the use of trip bars, light curtains, etc.

5.8.1.3.3 Prevention of ignition of web material

Ignition of the web material when passing through the continuous-flow dryer shall be prevented.

NOTE This can be achieved in case of a stoppage of the machine or the coating unit, for example, by adequately reducing the performance of the continuous-flow dryer and maintaining the web material at an adequate distance from the source of radiation by an air wiper.

5.8.1.3.4 Safety check valves

Where hydraulic or pneumatic cylinders are provided for opening the dryer, overridable safety-rated check valves shall be fitted to the lifting cylinders.

5.8.1.3.5 Protection from falling shut

To prevent the dryer from falling shut during inspection operations, mechanical devices shall be provided to secure the dryer open.

NOTE For example, the dryer can be prevented from falling shut by means of struts that are inserted during inspection.

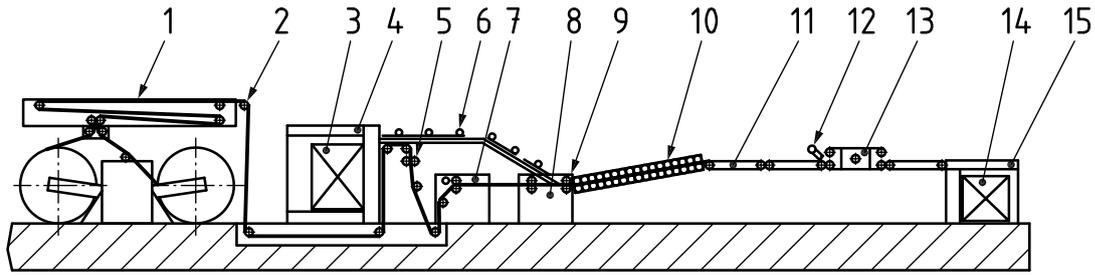
5.8.2 Laminators

5.8.2.1 Safeguarding in-running nips

The in-running nips between the foil-laminated tear-resistant web and guide rollers that can be accessed in the machine from passageways and that have a wrapping angle of 45° or more (see [Figure 22](#)) shall be protected by fixed or interlocking guards.

The in-running nip on the laminating rollers shall be protected by fixed or interlocking guards. Where the thickness of the laminated material is 18 mm or more, the opening width shall be a maximum of 30 mm and the distance from the guard opening to the nip shall be a minimum of 200 mm.

If safeguarding is done by roll displacement, the rolls shall have a displacement of at least 25 mm or a force of 50 N is not exceeded upon contact with and due to the mass of the roller.



Key

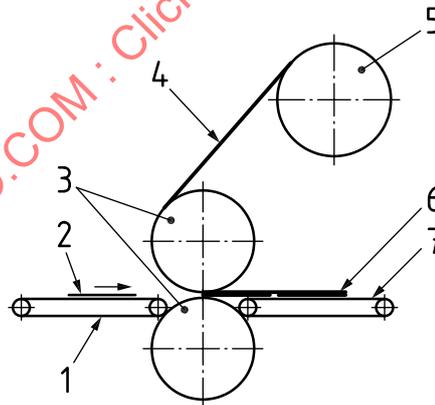
- | | | | |
|---|------------------|----|--------------------|
| 1 | unwinding unit | 9 | laminating rollers |
| 2 | guide roller | 10 | pressing belt |
| 3 | stack in feeder | 11 | transport belt |
| 4 | feeder | 12 | package stop |
| 5 | rotary knife | 13 | turning belt |
| 6 | transport rolls | 14 | stack in delivery |
| 7 | glue unit roller | 15 | delivery |
| 8 | sheeter | | |

Figure 24 — Web-fed laminator for sheet material

5.8.2.2 Safeguarding traversing movement of laminating rollers

During make-ready and cleaning, the traversing movement of the laminating rollers (see [Figure 25](#)) shall be safeguarded.

If safeguarding is achieved by speed limitation, speed shall not exceed 5 m/min under hold-to-run control. If guards are used, they shall be interlocked.



Key

- | | | | |
|---|---------------------------|---|------------------------|
| 1 | feeding belt | 5 | unwinding unit |
| 2 | substrate (single sheets) | 6 | laminated single sheet |
| 3 | laminating rollers | 7 | delivery belt |
| 4 | foil web | | |

Figure 25 — Foil laminator

5.8.2.3 Safeguarding opening and closing movement of laminating rollers

Where the travel path of the laminating rollers is greater than 6 mm, the opening and closing movement of the rollers shall be safeguarded.

If safeguarding is achieved by speed limitation, speed shall not exceed 5 m/min under hold-to-run control. If guards are used, they shall be interlocked.

5.8.2.4 Safeguarding heated lamination rollers

Where hot foil is used for lamination, guards shall be used to prevent contact of personnel where the lamination rollers are heated to more than 65 °C.

5.8.2.5 Sheeters on laminating machines

5.8.2.5.1 Safeguarding in-running nips

The in-running nip between pressure rollers or guide rollers and a pressing belt (see [Figure 24](#)) shall be safeguarded.

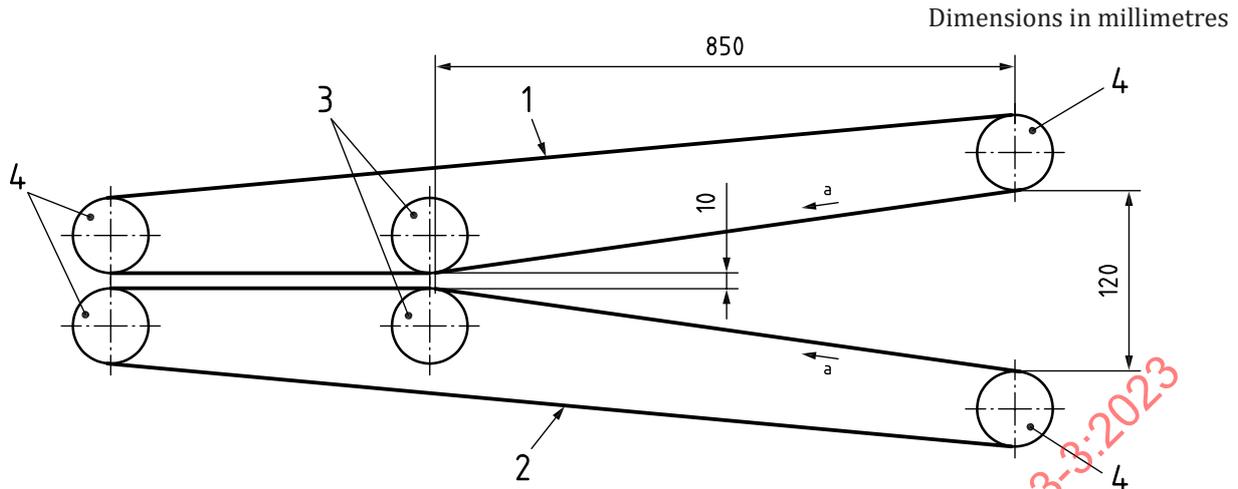
If safeguarding is achieved by limiting the force of the rollers, it shall be ensured that the pressure rollers are held in position by their own mass and have a displacement of at least 120 mm.

On pressing belts, the in-running nip between the upper and the lower pressing belts on the infeed point shall be safeguarded. Any of the following measures is considered to be adequate:

- a) use of guards meeting the requirements of ISO 12643-1:2023;
- b) where the pressing belt entrance opening is 120 mm, limiting the safety distance to 850 mm, measured from the point of entrance of the pressing belt up to the point at which there is a distance of 10 mm between the upper and the lower pressing belts (see [Figure 26](#)), and safeguarding access from the side;
- c) where the pressing belt entrance opening is 120 mm and the 850 mm safety distance cannot be met, limiting the force of the pressure rollers to 200 N and safeguarding access from the sides.

5.8.2.5.2 Safeguarding crushing points

The crushing point between transport belt and package stop (see [Figure 24](#)) shall be safeguarded by fixed or interlocking guards if the maximum clamping force when closing is more than 150 N.



Key

- 1 upper pressing belt
- 2 lower pressing belt
- 3 pressure rollers
- 4 guide rollers
- a Direction of belt.

Figure 26 — Pressing belt

5.9 Guillotine cutters

5.9.1 Knife cycles

All knife drives and controls shall incorporate a single-cycle device. Any programmable sequence of knife and clamp bar motions shall be operator-initiated and shall be interlocked to safety devices. Actuation of a stop control shall override the programmed sequence and stop the hazardous motion.

At the end of each cutting cycle, the knife shall automatically stop in a fully retracted position, with the knife edge completely covered by the clamp bar. Failure of the knife to stop at this position shall place the machine in a condition in which it is required to be reset or restarted manually.

Motion of the knife in the cutting direction shall stop upon any interruption of the cutting cycle or activation of safety devices, and the knife shall return to a fully retracted position (see also 5.9.2).

Machines that use light curtains, or other protective means that are dependent on the stopping performance, shall monitor stopping performance (both stopping time and position) at each knife stop. Failure of the knife to stop within the designed stopping performance shall place the machine in a condition in which it is required to be reset or restarted manually.

NOTE 1 Machines with a hydraulically operated knife can be monitored only after an interruption of the cutting cycle.

The method used to monitor stopping performance shall be capable of determining whether the knife stops within the specified stopping criteria. If the knife does not stop within the specified stopping criteria, the machine shall be placed in a condition in which it is required to be reset or restarted manually.

Machines incorporating motor/flywheel/clutch-knife drives shall be equipped with an anti-repeat device.

NOTE 2 Examples of mechanical devices that can be used to accomplish this include safety bolts, latches, safety clutches, cutout/flat spot in main drive gear.

The cutting edge of the knife shall not extend beyond the clamp bar during the clamping and the unclamping portions of the cutting cycle. The clamping and unclamping portions of the cutting cycle are those times when the clamp bar is in motion. Once the clamp bar has come to rest on the product to be cut, the knife will pass beyond the clamp bar to complete the cutting portion of the cutting cycle. This is the only time during which the knife is permitted to extend beyond the clamp bar.

5.9.2 Interruption of cutting cycles

In machines with knife drives utilizing stored energy, the knife shall stop in the event of loss of any power source affecting the knife drive (electrical, hydraulic, pneumatic, etc.).

Machines with a crank-driven knife movement that cannot reverse its movement shall be so designed that the clamp bar is not allowed to retract to its starting position automatically after the cutting cycle has been interrupted.

Motion of the knife in the cutting direction shall stop upon any interruption of the cutting cycle or activation of any of the safety devices. For hydraulically driven machines, retraction of the knife and clamp bar shall be automatic or an optional selector switch shall be provided to initiate retraction of the clamp bar by one of the following methods:

- automatic retraction of the cutting knife and the clamp bar;
- automatic retraction of the cutting knife and the clamp bar only after pushing a button;
- initiation of a new cutting cycle by means of two-hand control when the clamp bar is in the lower position.

5.9.3 Clamping

5.9.3.1 Clamping pressure

During manual loading, positioning and unloading of material by an operator, high-pressure clamping shall be prohibited through design. Low-pressure or manual clamping is permissible during positioning of the material within the cutting zone. High-pressure clamping shall be possible only while machine operation is under two-hand control or during an automatic cut sequence.

During loading, unloading or positioning by a gripper, high-pressure clamping is permitted.

In machines equipped with power-driven clamp bars, the interruption of any function that incorporates high-pressure clamping shall cause all clamping motion in the downward direction to stop.

NOTE Power failure is considered to be an interruption of function.

5.9.3.2 Low-pressure clamping

The clamping force of a power-driven clamp bar during low-pressure clamping shall not exceed 300 N on cutting machines of up to and including 1,6 m wide, or 500 N on cutting machines greater than 1,6 m wide.

5.9.3.3 Low-pressure and manual clamping

Low-pressure clamping may be obtained by the use of either a manual control or a power-driven clamping device.

Low-pressure power-driven clamping may be obtained by means of an operator-initiated control. Such control shall be separate from the control used for high-pressure clamping.

The control for power-driven low-pressure clamping shall not be of the latching type. Upon release of the control, the clamp bar shall immediately return to its retracted position.

For manual clamping controls, release of the clamp bar actuator shall cause the clamp bar to remain stationary or return to the retracted position.

During knife servicing, the clamp bar may be latched by a separate control.

5.9.3.4 Clamp bars

Cutouts, lips or holes on the side of the clamp bar facing the knife shall be safeguarded by the use of covers or plugs.

5.9.3.5 Automatic clamp bar operation

Any programmable system sequence of clamp bar motion shall be operator-initiated and shall be interlocked to safety devices. Actuation of a stop control shall override the programmed sequence and shall stop the hazardous motion.

5.9.4 Failure of knife and clamp bar linkages

Failure of the mechanical linkages supporting the knife carrier or clamp bar shall not result in hazardous movement of the knife or clamp bar.

NOTE This requirement is satisfied, for example, by providing additional mechanical or other means to prevent the knife or clamp bar from falling.

5.9.5 Backgauge

5.9.5.1 General

Any power-driven backgauge shall be interlocked with the knife and the clamp bar controls to prevent forward backgauge movement during high-pressure clamping and cutting.

If a programmable sequence is stopped as the result of the activation of a safety device, hazardous movement of the backgauge shall also stop.

Power-up shall not result in backgauge motion.

Actuation of a stop control shall override the programmed sequence and shall stop hazardous motion.

5.9.5.2 Guarding the rear of machines

Guards and/or other safety devices shall prevent access to knife, clamp bar and backgauge hazard points on guillotine cutters from the rear of the machine.

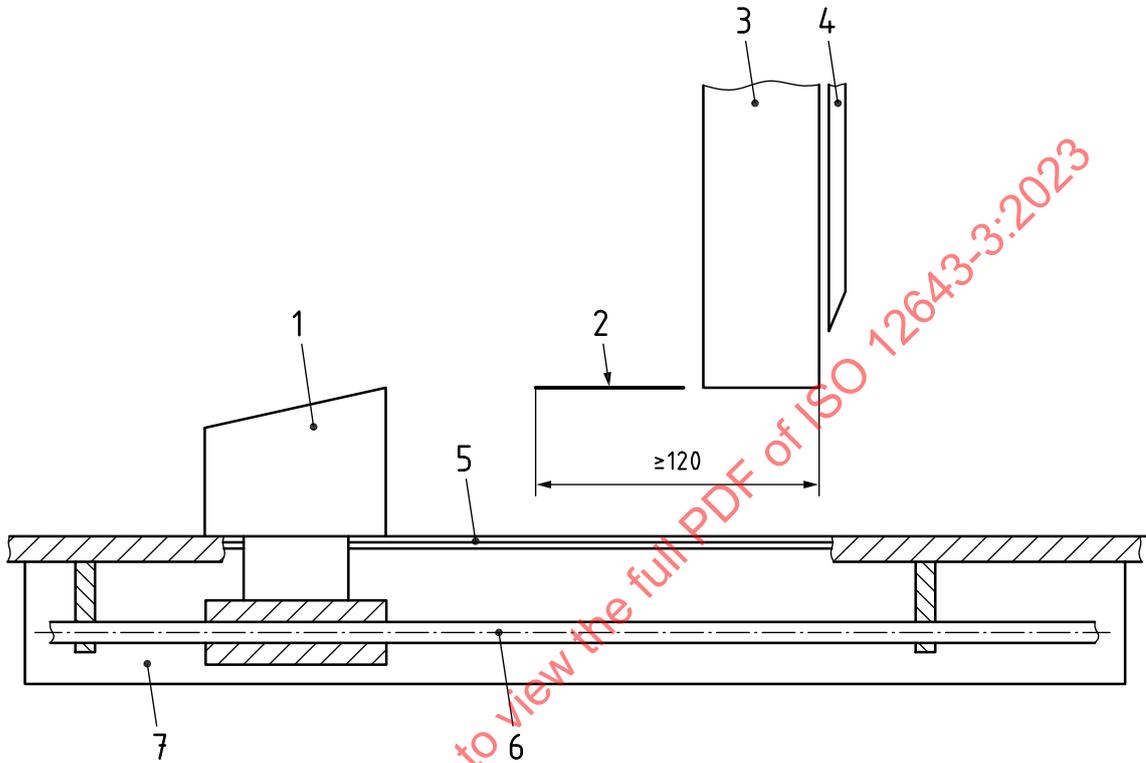
5.9.5.3 Automatic backgauge travel

Where the backgauge can travel automatically, the hazard point between the back edge of the clamp bar and the backgauge shall be safeguarded by one or more of the following measures:

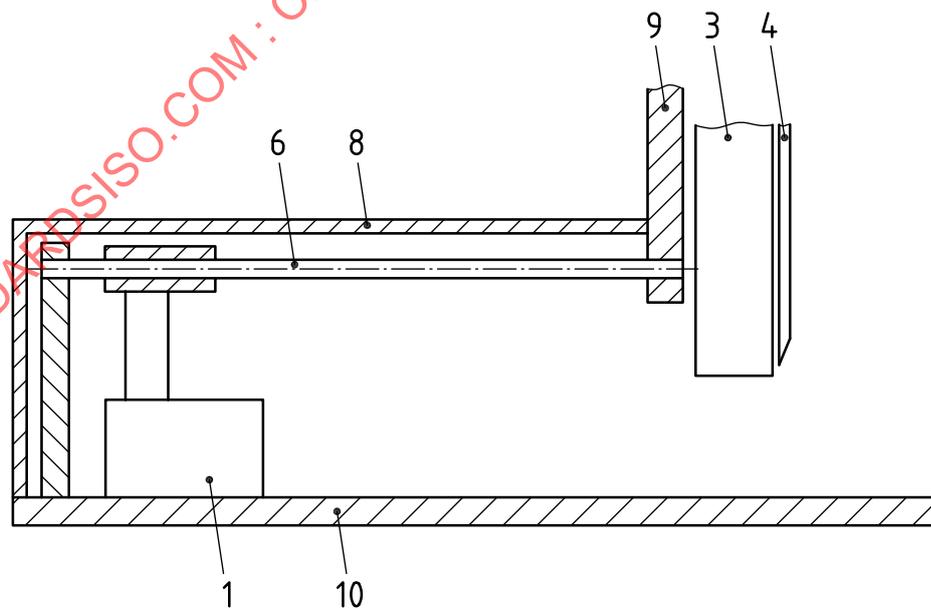
- active electro-sensitive protective devices (ESPDs);
- automatic travel limited to at most 25 mm before the clamp bar, with further travel possible only under hold-to-run control with a maximum speed of 3 m/min;

- protection against reaching below the clamp bar by providing a guard that makes the hazard point between guard and backgauge at least 120 mm behind the front edge of the clamp bar [see [Figure 27 a\)](#) and [27 b\)](#)];
- hold-to-run control.

Dimensions in millimetres



a) Spindle located under the table



b) Spindle located above the table

Key

1	backgauge	6	spindle
2	guard	7	under table cover
3	clamp bar	8	cover for feed drive
4	knife	9	bearing block
5	slot cover belt	10	table

Figure 27 — Protection against reaching below the clamp bar

5.9.5.4 Backgauge spindle

Access to the entire length of the backgauge spindle from the top shall be prevented.

NOTE For example, for safeguarding this point, a blind covering the spindle on the rear table can be used.

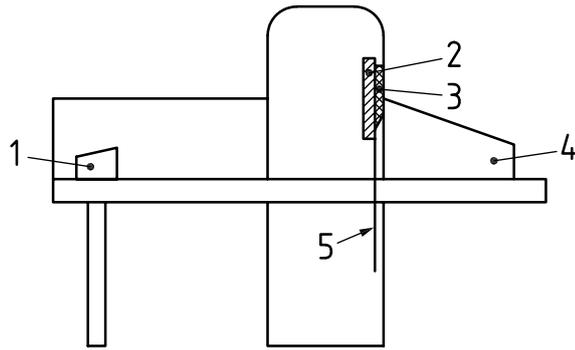
Access to the spindle from the underside of the rear table shall be prevented by fixed guards unless access is prevented by the position of the spindle. [see [Figure 27 a](#)) and [27 b](#))]

5.9.6 Guarding front (operating side) of a guillotine

ESPDs protecting against incidental contact with the knife and the clamp bar shall be active during that portion of the cutting cycle and/or high-pressure clamping during which hazardous motion occurs or is possible.

Access to knife and clamp bar hazard points shall be prevented from the front (operating side) of the machine by one or more of the following means, which shall be combined with the use of two-hand control:

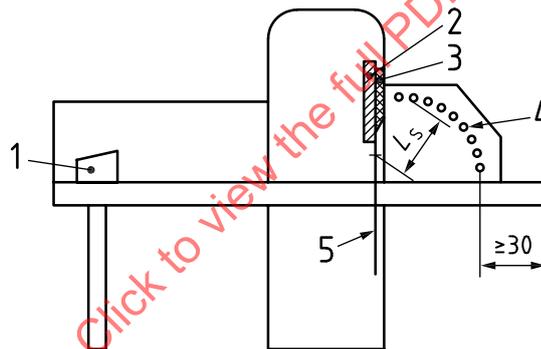
- an interlocking guard in accordance with ISO 14119:2013 and ISO 14120:2015 without side openings in the guard; and openings on the front side of the guard shall be designed in accordance with ISO 13857:2019 (see [Figure 28](#));
- active ESPDs extending to the machine table without side openings in the guard; the front table shall extend at least 30 mm beyond the safety distance L_s (outermost beam) of the ESPD; positioning of the ESPD shall be in accordance with [Figure 29](#);
- active ESPDs that do not extend to the machine table; the front table shall extend at least 30 mm beyond the safety distance L_s (outermost beam) of the ESPD; positioning of the ESPD shall be in accordance with [Figures 30, 31, 32, 33](#) or [34](#).



Key

- 1 backgauge
- 2 clamp bar
- 3 knife
- 4 interlocking guard
- 5 cutting plane

Figure 28 — Guillotine (side view) with interlocking guard on the front side

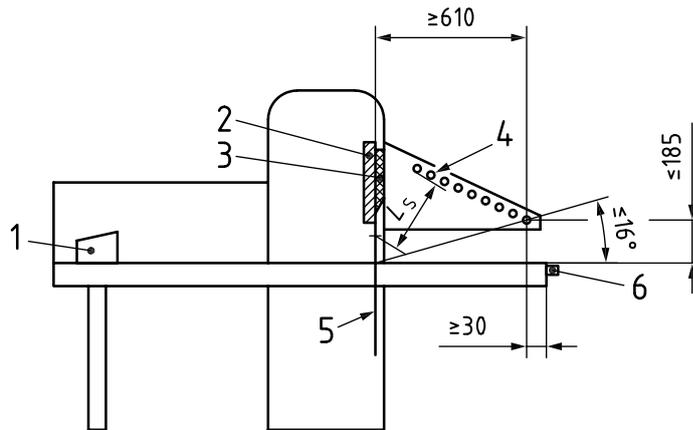


Key

- | | |
|-------------|-----------------------|
| 1 backgauge | 4 ESPD |
| 2 clamp bar | 5 cutting plane |
| 3 knife | L_s safety distance |

Figure 29 — Guillotine (side view) with ESPDs

Dimensions in millimetres



Key

- | | | | |
|-------|-----------------|---|--------------------|
| 1 | backgauge | 4 | beam of front ESPD |
| 2 | clamp bar | 5 | cutting plane |
| 3 | knife | 6 | two-hand control |
| L_S | safety distance | | |

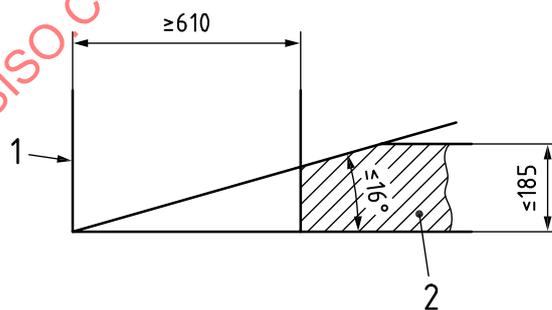
Figure 30 — Guillotine (side view) with ESPDs and two-hand control

The minimum distance of the ESPD shall be calculated as shown in [Formula \(A.1\)](#) in [Annex A](#), based on a resolution capability of equal to or less than 40 mm and measured when projected on the centre point between the machine table and the lower edge of the clamp bar (see [Figure 29](#) and [Figure 30](#)).

The maximum distance of the ESPD beams, measured between the centres of the optical systems, shall not exceed 55 mm for a resolution capability of equal to or less than 40 mm.

The outermost beam of the ESPD shall be arranged on the side of the maximum opening angle of 16°, but the distance to the machine table shall not be more than 185 mm (see [Figure 30](#)). The minimum distance to the cutting plane shall be 610 mm (see [Figure 31](#)).

Dimensions in millimetres



Key

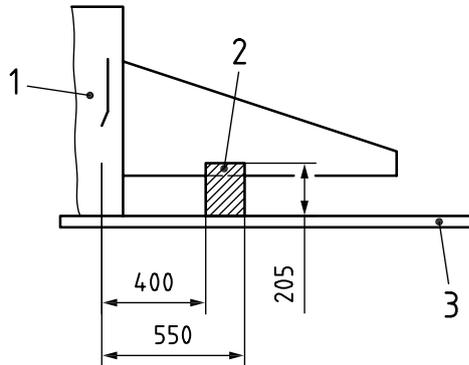
- | | |
|---|--|
| 1 | cutting plane |
| 2 | area admissible for outermost beam of ESPD |

Figure 31 — Arrangement of the outermost beam of the ESPD for clamp openings of less than or equal to 185 mm

On guillotine cutters with an automatic cutting sequence, an additional ESPD shall be provided at a distance of between 400 mm and 550 mm from the cutting plane, and at a height of between 0 mm and 205 mm from the table surface (see [Figure 32](#)). The first cutting cycle shall be started by two-hand

control. Following cutting cycles are started automatically. During the automatic cutting sequence, the backgauge shall be allowed to travel only toward the front (direction of the clamp bar).

Dimensions in millimetres



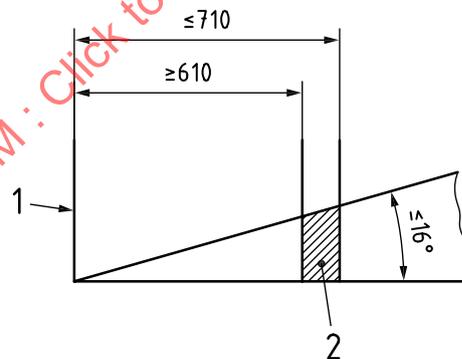
Key

- 1 cutting plane
- 2 area admissible for additional ESPD
- 3 front of table

Figure 32 — Position of additional ESPD

As an exception, on machines with a usable pile height of more than 185 mm, the outermost beam of the ESPD may be arranged at a maximum angle of 16° to the lowest point of the cutting plane and at a distance of 610 mm minimum and 710 mm maximum from the lowest point of the cutting plane (see [Figure 33](#)).

Dimensions in millimetres



Key

- 1 cutting plane
- 2 area admissible for outermost beam of ESPD

Figure 33 — Arrangement of the outermost beam of the ESPD for clamp bar openings greater than 185 mm

On guillotine cutters with openings less than or equal to 165 mm between the outer housing of the ESPD and machine table, the safety distance depicted in [Figure 34](#) shall be greater than or equal to 550 mm, as specified by [Formula \(1\)](#), and shall be observed between the lowest point of the cutting plane and the outer edge of the housing, or guards shall be provided. On guillotine cutters with openings greater than 165 mm, a safety distance of greater than or equal to 850 mm shall be required.

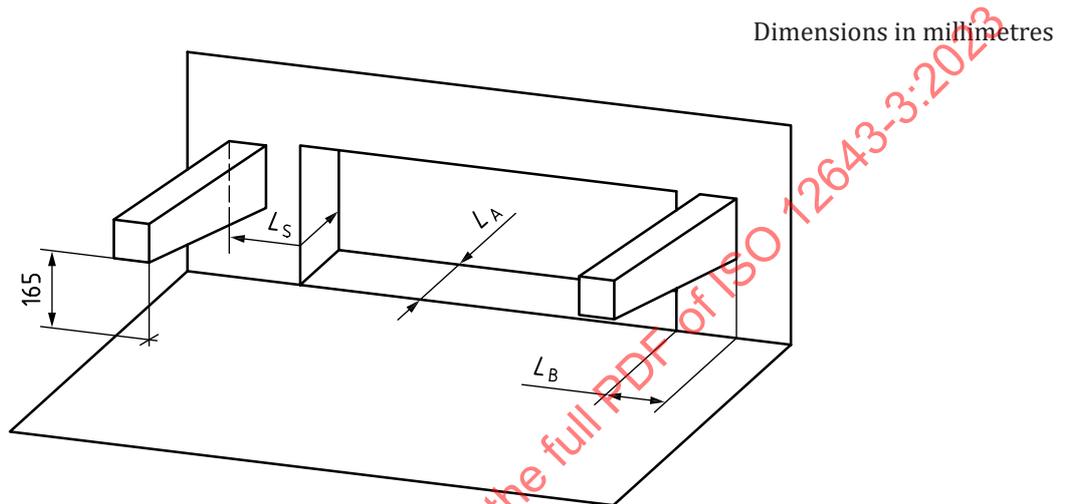
$$L_S = L_A + L_B \tag{1}$$

where

L_S is the safety distance, in millimetres;

L_A is the distance, in millimetres, from the lower edge of the cutting plane to the outer plane of the machine frame;

L_B is the distance, in millimetres, from the outer edge of the ESPD to the inner edge of the machine frame.



Key

L_S safety distance

L_A distance from lower edge of cutting plane to outer plane of machine frame

L_B distance from outer edge of ESPD to inner edge of machine frame

Figure 34 — Safety distance

5.9.7 Pile-support angles (jogging blocks)

For cutting strips, a pile-support angle (jogging block) shall be provided (see [Figure 35](#) for an example of a pile-support angle).

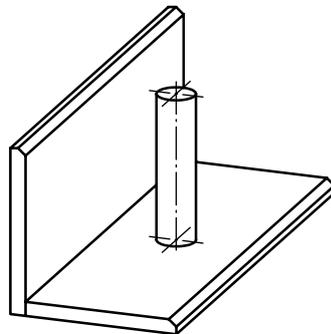


Figure 35 — Pile-support angle

5.9.8 Knife changing and adjustment

Changing and adjusting the knife shall be performed only by authorized, competent and properly trained personnel.

For installing or removing the knife, means shall be provided to prevent the person handling the knife from being exposed to the cutting edge of the knife. The instruction handbook shall describe safe practices for changing knives (see [7.7](#)).

When knives are being changed or adjusted, both the knife blade and hazardous movements shall be safeguarded.

Knife descent shall be possible only by one or more of the following:

- two-hand controls and safeguarding by ESPDs;
- two-hand controls with the interlocking guard closed;
- mechanical means to engage the clutch.

NOTE In the United States, knife changing is considered to be a maintenance task, and lockout/tagout procedures as defined by OSHA are applicable (see OSHA 29 CFR 1910.147^[8] or ANSI Z244.1^[5]).

5.9.9 Hazards from integral feeding and delivery equipment on guillotine cutters

5.9.9.1 Crushing point at gripper

The crushing point at the gripper on the feeding table shall be safeguarded.

NOTE Measures for safeguarding this area using photoelectric devices include the following:

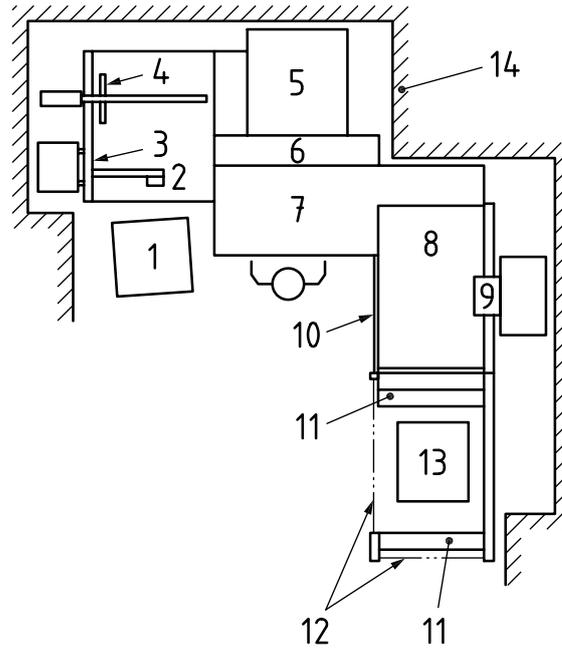
- functional photoelectric device detecting the upper edge of the paper pile;
- functional photoelectric device detecting the front edge of the paper pile;
- functional photoelectric device detecting the presence of paper in the gripper.

If photoelectric devices are used to safeguard this area, the gripper shall be allowed to close only after all photoelectric devices have been operated in the given sequence.

5.9.9.2 Hazard point between feeding table and guillotine

The hazard point between the feeding table and the guillotine, caused by the vertical movement of the table, shall be safeguarded (see [Figure 36](#)).

NOTE Safeguarding can be achieved, for example, by providing a trip device.



Key

- | | | | |
|---|---------------|----|-----------------|
| 1 | paper pile | 8 | delivery table |
| 2 | gripper | 9 | hold-down |
| 3 | feeding table | 10 | guard |
| 4 | pusher | 11 | aligning gauges |
| 5 | rear table | 12 | ESPDs |
| 6 | guillotine | 13 | pallet |
| 7 | front table | 14 | fence guard |

Figure 36 — Loading and unloading (feeding and delivery) equipment

5.9.9.3 Hazard point between pusher and table

The hazard point between the pusher on the feeding table and the feeding table or rear table of the machine shall be safeguarded.

NOTE Safeguarding can be achieved, for example, by limiting the distance between the lower edge of the pusher and the table to no more than 6 mm.

The safety distance between the back of the pusher and fixed machine parts shall be at least 100 mm.

5.9.9.4 Hazard point between delivery table and front table

The hazard point between the delivery table and the front table of the guillotine, caused by the horizontal movement of the delivery table, shall be safeguarded.

NOTE Safeguarding can be achieved, for example, by providing guards or trip bars.

5.9.9.5 Hazard point between delivery table and fixed parts

The hazard point between the delivery table and fixed machine parts, caused by the vertical movement of the table, shall be safeguarded.

NOTE Safeguarding can be achieved, for example, by providing trip devices.

5.9.9.6 Hazard points between delivery table and floor or pallet

The hazard points between the delivery table and the floor or pallet shall be safeguarded.

This can be achieved, for example, if all of the following requirements are met:

- access from the back of the equipment is prevented by guards in accordance with ISO 13857:2019 (see [Figure 36](#), item 14);
- guards are provided on the front of the delivery table (see [Figure 36](#), item 10);
- two ESPDs safeguard the delivery area (see [Figure 36](#), item 12), or other guards such as an ESPD in front of the delivery table and trip nip guards under the delivery table to safeguard the delivery area while the delivery table is in its forward or downward movement;
- an emergency stop device is provided in the delivery area.

5.9.9.7 Hazard points between delivery table and aligning gauge

The hazard points between the delivery table and the aligning gauge shall be safeguarded.

This can be achieved, for example, if the aligning gauge lowers under its own mass, or the force to lower the gauge is as recommended in ISO 12643-1:2023 for crushing and shearing hazards.

5.9.9.8 Hazard point between hold-down and delivery table

The hazard point between the hold-down and the delivery table shall be safeguarded.

This can be achieved, for example, by one of the following:

- hold-down devices are fitted at a minimum distance of 850 mm from the edge of the delivery table;
- the maximum force of the hold-down is limited to 500 N.

5.10 Trimmers and three knife trimmers

For manually fed machines using a conveyor that puts the product into the cutting zone, feeding and delivery openings shall be designed in accordance with ISO 13857:2019.

On the feeding and delivery side, a safety distance of 550 mm to the nearest hazard point is acceptable if the trimmer is mounted in line and product removal is performed by mechanical means (see [Figure 37](#)).

Dimensions in millimetres

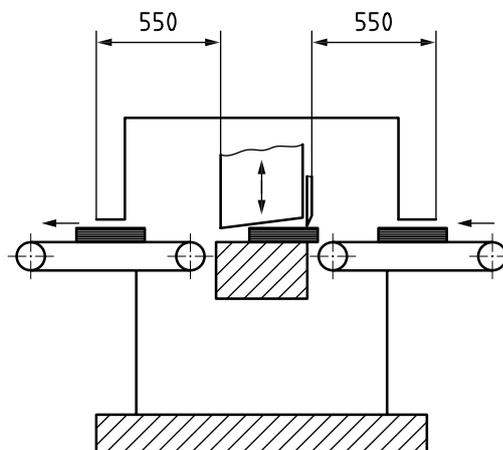


Figure 37 — Trimmer with automatic feed

Where material is fed manually into the hazard zone by the operator, the hazard points on the operator side of the trimmer shall be safeguarded by a two-hand control located on the front edge of the feed table. The requirements for two-hand controls as specified in ISO/FDIS 12643-1:2023 shall be met. Feeding apertures on the operator side of the trimmer shall be as small as possible, consistent with the size of the format cut.

When the interlocking guard is opened, it shall be possible to start the trimmer only by means of two-hand controls. Operation of the control with the guard open shall allow only a single stroke of the knives, regardless of how long the control is held. The means to monitor the limitation to a single stroke of the knife shall be in accordance with at least ISO 13849-1:2023, PL c or IEC 62061:2021, SIL 1.

Knife covers to be applied for knife changing and transport of knives shall be supplied with the machine.

Openings and safety distances on waste discharge chutes shall satisfy the requirements of ISO 13857:2019.

For trimmers that have an automatic vacuum system or exhaust system to remove paper cuttings, the system shall be in accordance with the requirements for explosion prevention and protection specified in ISO 12643-1:2023.

5.11 Three-knife trimmer with manual infeed

The closing movement of the infeed gripper shall take place with reduced force (not to exceed 100 N) or be protected by an interlocking guard with guard locking. Maximum force should only be applied when the movement of the infeed gripper into the three-knife trimmer has started.

The knives and the pressing plate shall be protected by an ESPD and/or by interlocking guards with guard locking as specified in A.1 of [Annex A](#) [see [Formula \(A.1\)](#) and [\(A.2\)](#) for the calculation of safety distance].

If ESPD is used which does not extend to the table, the following requirements shall be fulfilled:

- The front light beam of the ESPD shall be positioned, not more than 16°, on the leg of the opening angle and located at a height of no more than 185 mm above the surface of the table.
- The minimum distance of the foremost light beam shall be placed at least 610 mm in front of the cutting lines on the sides. The length of the front table shall be at least 30 mm beyond the front ESPD to the cutting line.
- The clearance between the lower edge of the light barrier housing and the table shall not exceed 165 mm.
- The distance between the outer edge of the light barrier housing and the cutting line shall be at least 550 mm.

The knives and the pressing plate shall not be accessible through the opening for cutting waste. A minimum distance of 850 mm should be required. A safety distance of 550 mm is sufficient if danger points are not accessible with an outstretched arm from the opening for cutting waste.

NOTE When the opening for cutting waste is located near the floor, danger points are not accessible with outstretched arms.

The knives and the pressing plate shall not be within reach through the delivery opening. Fixed guards at the delivery opening with minimum safety distances of 850 mm shall be provided.

The safety-related control system (knives, pressing plate) shall meet at least ISO 13849-1:2023, PL d or IEC 62061:2021, SIL 2.

Knife covers to be applied for knife changing and transport of knives shall be supplied with the machine.

5.12 Inserters/attaching machines

The exception specified in 5.2.2 can be applied to feeder guards for inserters/attaching machines, if necessary.

5.13 Overcover/protective wrapper gluers

The exception specified in 5.2.2 can be applied to feeder guards for overcover/protective wrapper gluers, if necessary.

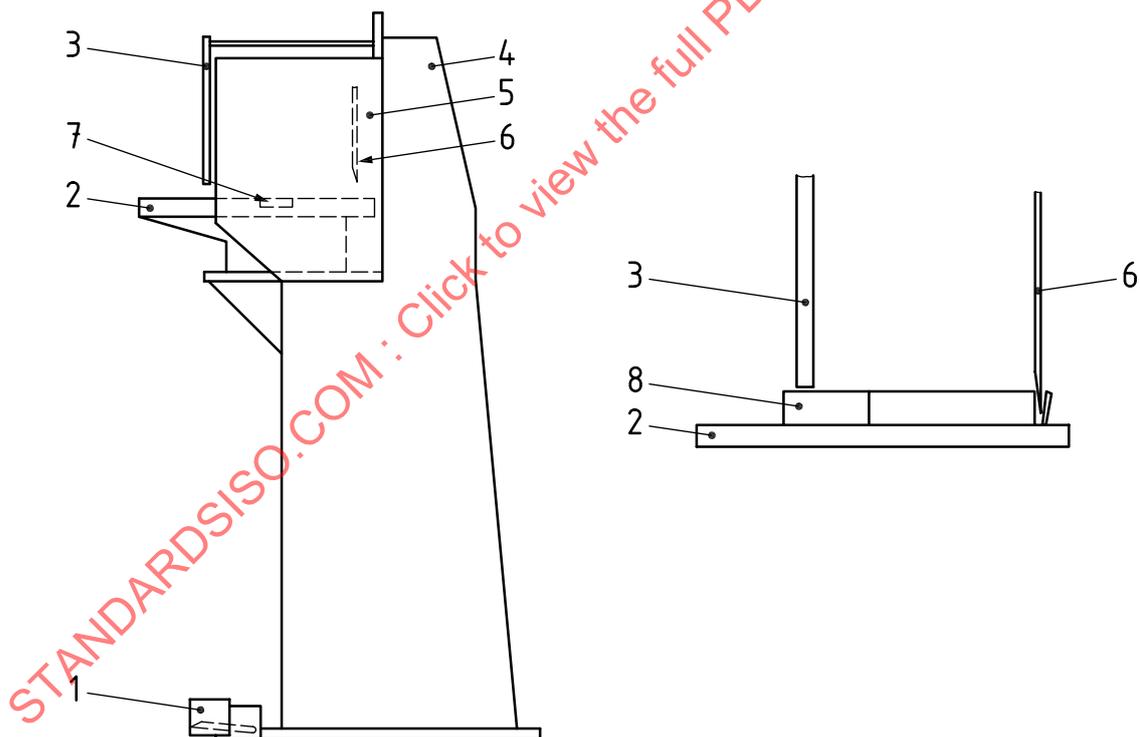
5.14 Corner-rounding machines

On corner-rounding machines (see Figure 38), the hazard point at the trimming knife or saw shall be safeguarded.

NOTE This requirement is met, for example, by providing an adjustable transparent guard in front of the knife and ensuring, by using a sensor (e.g. a photoelectric device), that the cutting operation can only be started once a pile has been fed. See Figure 38.

Operation of the knife or saw shall only be possible by means of a hold-to-run control (hand- or foot-operated).

Fixed or interlocking guards shall be provided at the back and on both sides of the knife or saw.



Key

- | | | | |
|---|--|---|--------------------------------|
| 1 | foot-operated hold-to-run control | 5 | side guard |
| 2 | feeding table | 6 | knife |
| 3 | adjustable transparent guard in front of knife | 7 | sensing device (photoelectric) |
| 4 | guard at back | 8 | book block |

Figure 38 — Corner-rounding machine

6 Verification of the safety requirements and/or protective/ risk reduction measures

Table 2 describes the methods used to verify that the safety requirements and/or measures described in Clause 5 are complied with.

Table 2 — Verification of safety requirements and/or protective/risk reduction measures

Subclause number	Title	a) Calculation	b) Visual inspection	c) Measurement	d) Testing
5.2	Interlocks				
5.2.1	Interlocking with guard locking		x	x	x
5.2.2	Exception for machine motion at inching speed			x	x
5.2.3	Exception for machine motion at production speed		x	x	x
5.3	Guarding of hoppers and hopper feeders				
5.3.1	Manually loaded hoppers	x	x	x	
5.3.2	Guarding of automatically fed hoppers			x	
5.3.3	Protection of unused hoppers and hopper feeders		x		
5.3.4	Separating elements on hopper feeders	x	x		
5.4	Guarding on binding and finishing machines				
5.4.1	Hand-fed riveting, eyeletting and attaching machines		x	x	x
5.4.2	Hand-fed flat- and saddle-stitching machines		x		x
5.4.3	Gang stitchers and drum stitchers		x	x	
5.4.3.1	Feeders on gang stitchers and drum stitchers				
5.4.3.2	Guarding stitching section of gang stitchers		x	x	x
5.4.3.3	Caliper roll		x	x	x
5.4.3.4	Transport-chain pushers on gang stitchers		x	x	
5.4.3.5	Starting gang stitchers and drum stitchers with a guard open		x	x	x
5.4.3.6	Trimmer on gang stitchers and drum stitchers	x	x	x	
5.4.4	Gathering machines				
5.4.4.1	General				
5.4.4.2	Guarding transport chains		x	x	
5.4.4.3	Starting gathering machines with a guard open		x	x	x
5.4.4.4	Feeder	x	x	x	x
5.4.4.5	Feeding section		x		x
5.4.4.6	Emergency stop system		x	x	x
5.4.5	Perfect binders				
5.4.5.1	Guarding book carriage hazards	x	x	x	x
5.4.5.2	Hazards in the gluing unit		x	x	x
5.4.5.3	Glue pans	x	x	x	x
5.4.5.4	Cover feeder		x	x	
5.4.5.5	Delivery area		x	x	
5.4.5.6	Starting perfect binders with a guard open		x	x	x
5.4.5.7	Milling head cutter (saw)		x		x
5.4.5.8	Additional requirements for hand-fed perfect binders		x	x	x

Table 2 (continued)

Subclause number	Title	a) Calculation	b) Visual inspection	c) Measurement	d) Testing
5.4.5.9	Emergency stop		x	x	x
5.4.6	Paper drills				
5.4.6.1	Single-head hand-fed paper drills		x	x	x
5.4.6.2	Guarding the trapping hazard on multi-head drilling machines		x	x	x
5.4.7	Book signature presses		x		x
5.4.8	Book press		x	x	x
5.4.9	Sheet-folding machines				
5.4.9.1	Guarding hazard points at the folding rollers		x		x
5.4.9.2	Machine motion with a guard open		x		x
5.4.10	Book production lines for the production of hard-cover books				
5.4.10.1	General		x	x	x
5.4.10.2	Safeguarding hazard points in glue sections	x	x	x	
5.4.11	Back-rounding and pressing machines				
5.4.11.1	Safeguarding in-running nips on feed and delivery belts		x	x	
5.4.11.2	Safeguarding hazard points on tipping section		x	x	x
5.4.11.3	Safeguarding hazard points on pre-forming, back-rounding and pressing sections		x	x	x
5.4.12	Backlining and head-banding machines				
5.4.12.1	Safeguarding in-running nips		x	x	
5.4.12.2	Safeguarding gauze section hazards		x		
5.4.12.3	Safeguarding head-banding section hazards		x	x	x
5.4.12.4	Safeguarding counter-pressure section hazards		x	x	x
5.4.13	Casing-in (case-binding) machines				
5.4.13.1	Safeguarding hazard points between book transport and fixed machine parts		x	x	x
5.4.13.2	Safeguarding hazard points at delivery		x	x	x
5.4.14	Book-cover crease-forming machines (presses)				
5.4.14.1	Safeguarding in-running nips, tipping section and pressing section		x	x	x
5.4.14.2	Motion with a guard open		x	x	x
5.5	Inserting and collating machines		x	x	x
5.6	Counter-stackers				
5.6.1	Safeguarding divert gates (waste separator)		x	x	x
5.6.2	Safeguarding hazard points at turntable		x	x	x
5.6.3	Pneumatic system		x		x
5.7	Paper-embossing machines				
5.7.1	Safeguarding in-running nips on guide rollers		x	x	x
5.7.2	Stretch rollers and counter rollers		x	x	
5.7.3	Safeguarding movement of counter roller		x	x	x
5.7.4	Insulation of heated parts			x	
5.8	Finishing machines				
5.8.1	Coaters				

Table 2 (continued)

Subclause number	Title	a) Calculation	b) Visual inspection	c) Measurement	d) Testing
5.8.1.1	Safeguarding in-running nips		x	x	x
5.8.1.2	Explosion prevention	x	x		
5.8.1.3	Continuous-flow dryers on coating devices				
5.8.1.3.1	Flammable substances		x		
5.8.1.3.2	Safeguarding hazard points on dryers		x	x	x
5.8.1.3.3	Prevention of ignition of web material		x		
5.8.1.3.4	Safety check valves		x		
5.8.1.3.5	Protection from falling shut		x		x
5.8.2	Laminators				
5.8.2.1	Safeguarding in-running nips		x	x	x
5.8.2.2	Safeguarding traversing movement of laminating rollers		x	x	x
5.8.2.3	Safeguarding opening and closing movement of laminating rollers		x	x	x
5.8.2.4	Safeguarding heated lamination rollers			x	
5.8.2.5	Sheeters on laminating machines				
5.8.2.5.1	Safeguarding in-running nips		x	x	x
5.8.2.5.2	Safeguarding crushing points		x	x	x
5.9	Guillotine cutters				
5.9.1	Knife cycles		x	x	x
5.9.2	Interruption of cutting cycles		x	x	x
5.9.3	Clamping				
5.9.3.1	Clamping pressure				x
5.9.3.2	Low-pressure clamping		x	x	x
5.9.3.3	Low-pressure and manual clamping		x		x
5.9.3.4	Clamp bars		x		
5.9.3.5	Automatic clamp bar operation		x		x
5.9.4	Failure of knife and clamp bar linkages		x		
5.9.5	Backgauge				
5.9.5.1	General		x		x
5.9.5.2	Guarding the rear of machines		x		
5.9.5.3	Automatic backgauge travel		x	x	x
5.9.5.4	Backgauge spindle		x		
5.9.6	Guarding front (operating side) of a guillotine	x	x	x	x
5.9.7	Pile-support angles (jogging blocks)		x		
5.9.8	Knife changing and adjustment	x	x	x	x
5.9.9	Hazards from integral feeding and delivery equipment on guillotine cutters				
5.9.9.1	Crushing point at gripper		x		x
5.9.9.2	Hazard point between feeding table and guillotine		x	x	x
5.9.9.3	Hazard point between pusher and table		x	x	x
5.9.9.4	Hazard point between delivery table and front table		x	x	x
5.9.9.5	Hazard point between delivery table and fixed parts		x	x	x

Table 2 (continued)

Subclause number	Title	a) Calculation	b) Visual inspection	c) Measurement	d) Testing
5.9.9.6	Hazard points between delivery table and floor or pallet		x	x	x
5.9.9.7	Hazard points between delivery table and aligning gauge		x	x	x
5.9.9.8	Hazard point between hold-down and delivery table		x	x	x
5.10	Trimmers	x	x	x	
5.11	Three-knife trimmer with manual infeed	x	x	x	x
5.12	Inserters/attaching machines				x
5.13	Overcover/protective wrapper gluers				x
5.14	Corner-rounding machines		x	x	x

7 Information for use — Contents of instruction handbook

7.1 Information for gang stitchers

Where production circumstances require the gang stitcher to be started by two-hand control at speeds greater than 10 m/min with the interlocking guards open, the instruction handbook shall contain the following warning:

WARNING — The person operating the two-hand control shall make sure that, before operating the control, there is no other person in the hazard area.

7.2 Information for gathering machines

Where production circumstances require the gathering machine to be started by two-hand control at speeds greater than 10 m/min with the interlocking guards open, the instruction handbook shall contain the following warning:

WARNING — The person operating the two-hand control shall make sure that, before operating the control, there is no other person in the hazard area.

7.3 Information for perfect binders

Where production circumstances do not allow the milling cutter to be stopped immediately when opening the interlocking guard covering the book carriage, the instruction handbook shall indicate the residual risk and the stopping time.

Where production circumstances require the perfect binder to be started with interlocking guards open, either by hold-to-run control at a speed greater than 5 m/min or by two-hand control at a speed greater than 10 m/min, the instruction handbook shall contain the following warning:

WARNING — The person operating the hold-to-run/two-hand control shall make sure that, before operating the control, there is no other person in the hazardous area.

Where polyurethane hot-melt glues are used, the instruction handbook shall give the following instructions:

- a) indication of the need to provide adequate exhaust equipment in the area of the glue duct and the preheater, specifying the minimum exhaust volume;
- b) instructions for removing hot glue ducts from the perfect binder and for cleaning the glue ducts;

EXAMPLE Instructions for cleaning glue ducts:

- 1) move the duct immediately under exhaust hood;
 - 2) clean duct with low-risk non-aromatic solvents;
 - 3) close glue duct cover during removal.
- c) indication of the need for adequate ventilation in the working area;
- d) indication of the need to follow the instructions on the material safety data sheet;
- e) warning not to leave glue reservoirs and glue ducts open;
- f) indication that an appropriate protective mask shall be provided for the operating personnel where the release of isocyanates cannot be excluded when the glue reservoir is changed or the glue ducts are cleaned or removed from the perfect binder; instructions for use of the mask shall also be given;
- g) indication that appropriate protective glasses and gloves shall be used when there is a hazard of spilling of the hot glue (e.g. during pressure clearing); eye-washing and cleaning equipment should be readily available in case glue gets into the eyes; for spills on skin, washing facilities should be available in the working area;
- h) indication to thoroughly clean hands when finishing work or taking breaks, and notation that operating personnel dealing with this type of glue should use a barrier hand cream or protective hand lotion;
- i) indication that soiled clothes shall be changed immediately;
- j) indication that eating, drinking and smoking are forbidden throughout the working area;
- k) information regarding residual risks.

7.4 Information for sheet folding machines

Where production circumstances require the sheet folding machine to be started by two-hand control at a speed greater than 10 m/min with guards open, the instruction handbook shall contain the following warning:

WARNING — The person operating the two-hand control is responsible for safe working practices. Before starting the machine, the operator shall make sure that there is no other person in the hazard area.

7.5 Information for inserting machines

Where production circumstances require the inserting machine to be started by two-hand control at a speed greater than 10 m/min with guards open, the instruction handbook shall contain the following warning:

WARNING — The person operating the two-hand control is responsible for safe working practices. Before starting the machine, the operator shall make sure that there is no other person in the hazard area.

7.6 Information for machines for the production of envelopes

The instruction handbook for machines for the production of envelopes shall contain a warning of the residual risk existing between the staggering wheel and the paper guides, if operator intervention is required at this point during production runs.

Where production circumstances require the machine to be started at a speed of more than 5 m/min with guards open, either when using a stroboscope and hold-to-run control, or at a speed greater than 10 m/min by two-hand control, the instruction handbook shall contain the following warning:

WARNING — The person operating the hold-to-run/two-hand control shall make sure that, before operating the control, there is no other person in the hazard area.

7.7 Information for guillotine cutters

The instruction handbook for guillotine cutters shall contain the following additional information:

- total response time of the system, in milliseconds;
- resolution capability of ESPDs, in millimetres;
- minimum distance of ESPDs, in millimetres.

The handbook for guillotine cutters shall also contain the instruction that safety devices shall be checked for effectiveness before each work shift and each time a knife has been changed, and that test results shall be recorded.

Measures to be taken in case of failure of transmission elements shall be described in order to enable safe repair, e.g. instructions that the paper pile shall not be withdrawn by force.

The instruction handbook shall indicate that there is a residual risk caused by the spindle under the rear table of the guillotine.

The instruction handbook shall describe safe working practices for changing knives, including the means of safeguarding knife blades and of adjusting the knives in order to prevent hazards from exposed knife edges. It shall give detailed instructions on the removal of the knives, using the tools and the knife covers supplied, and on the subsequent storage in knife boxes.

The instruction handbook shall indicate the need for regular checks of the guillotine against manufacturer specifications. Tests shall include the functioning of the control systems, monitoring of the stopping performance, clamping force, functioning of the ESPD, functioning of the two-hand control, and overrun protection in accordance with 5.9.1. The instruction handbook shall indicate that test results shall be recorded.

The instruction handbook shall require the changing of the knife be handled by authorized, competent and properly trained personnel.

7.8 Information for integral feeding and delivery equipment for guillotine cutters

The instruction handbook for integral feeding and delivery equipment for guillotine cutters shall warn of the residual risks associated with the feeding and delivery tables and with the gripper.

NOTE An example of such residual risks are impact hazards from the travelling table in front of the feeding table, hazards from the travelling delivery table in the delivery area or crushing hazards from the gripper.

The instruction handbook shall describe the correct positioning of the paper pile for feeding to ensure safe working conditions. It shall state, for instance, the distance and the angle between the paper pile and the feeding table.

The instruction handbook shall indicate that the floor area in front of the feeding table shall be painted in yellow and black warning colours in order to inform persons that this area is reserved for the paper pile.

The instruction handbook shall indicate that the floor area over which the delivery table passes shall be painted in yellow and black warning colours.

7.9 Information for trimmers

The instruction handbook for trimmers shall indicate that knife covers shall be used during setup operations.