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

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

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

Partie 3: Équipement et systèmes de reliure et de finissage

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Published in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 12643-3 was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

This first edition, together with ISO 12643-1, cancels and replaces ISO 12649:2004.

ISO 12643 consists of the following parts, under the general title *Graphic technology — Safety requirements for graphic technology equipment and systems*:

- *Part 1: General requirements* [ISO 12643-3:2008](https://standards.iteh.ai/catalog/standards/sist/13d89831-3197-4fbf-a466-5335254de5f2/iso-12643-3-2008)
- *Part 2: Press equipment and systems*
- *Part 3: Binding and finishing equipment and systems*

The following parts are under preparation:

- *Part 4: Converting equipment and systems*
- *Part 5: Stand-alone platen presses*

Introduction

During the development of this part of ISO 12643, existing relevant standards of other countries were taken into consideration. An effort has been made to harmonize the requirements of all countries, recognizing that national standards or laws may dictate national requirements. In cases where it was known that there is a national requirement that differs from this part of ISO 12643, that has been noted.

This part of ISO 12643 was developed to harmonize the following U.S. and European safety standards:

- ANSI B65.2, *Binding and finishing systems*;
- ANSI B65.3, *Safety standard — Guillotine paper cutters, mill trimmers and integral handling equipment*;
- ANSI B65.4, *Safety standard — Three-knife trimmers including rotary, and single- and multiple-knife trimmers*;
- EN 1010-1, *Safety of machinery — Safety requirements for the design and construction of printing and paper converting machines — Part 1: Common requirements*;
- EN 1010-3, *Safety of machinery — Safety requirements for the design and construction of printing and paper converting machines — Part 3: Cutting machines*;
- EN 1010-4, *Safety of machinery — Safety requirements for the design and construction of printing and paper converting machines — Part 4: Bookbinding, paper converting and finishing machines*.

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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 part of ISO 12643 provides requirements specific to binding and finishing equipment and systems. It is intended to be used in conjunction with the general requirements given in ISO 12643-1.

This part of ISO 12643 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. It can also be applicable to processes for preparing substrate for the printing process.

It is applicable to a wide range of equipment used in the binding and finishing process.

2 Normative references (standards.iteh.ai)

The following referenced documents are indispensable for the application 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, *Graphic technology — Safety requirements for graphic technology equipment and systems — Part 1: General requirements*

ISO 13732-1, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces*

ISO 13849-1:1999¹⁾, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13852, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs*

ISO 14119, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

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

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

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

EN 1539, *Dryers and ovens in which flammable substances are released — Safety requirements*

¹⁾ ISO 13849-1:1999 has been cancelled and replaced by ISO 13849-1:2006.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12643-1, ISO 13849-1:1999 and the following apply.

3.1 anti-repeat device
mechanical or electromechanical mechanism to ensure that only one cutting cycle occurs for each manual activation or automatic cut if the primary stopping system or **single-cycle device (3.32)** 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, and which is 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, and to determine the dimensions of the cut

3.5 backgauge drive
mechanism to position the **backgauge (3.4)** prior to the initiation of the cut

3.6 backlining and head banding machines
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

3.7 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

3.8 book press
press used for flattening books after binding

3.9 book signature press
power-operated press used for flattening book signatures, which are fed and aligned manually

3.10 casing-in machine
(hard-cover bookbinding) apparatus for gluing the end papers of the book signatures to the interior surfaces of the book cover

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

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3.12**clamp drive**

mechanism by which the **clamp(s)** (3.11) of the paper cutter is/are forced against the material to be cut

3.13**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

3.14**counter-stacker**

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

3.15**cutting cycle**

⟨for machines with (a) manually driven **clamp(s)** (3.11)⟩ programmed succession of operations that begins when the knife drive is activated and ends when the knife returns to its retracted position

3.16**cutting cycle**

⟨for machines with (a) power-driven **clamp(s)** (3.11)⟩ programmed succession of operations that begins when high-pressure clamping is initiated and ends when the knife(s) and clamp(s) return to their retracted positions after a single clamp/knife stroke

3.17**cutting zone**

three-dimensional space through which any part of the knife(s) and/or **clamp(s)** (3.11) travel(s) during the entire **cutting cycle** (3.16)

3.18**gang stitcher**

machine for stitching folded sheets of paper, during the operation of 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

3.19**gathering machine**

apparatus that assembles sheets or folded sheets in a binding line

3.20**guillotine cutter**

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

NOTE This definition includes equipment classified as mill trimmers.

3.21**high-pressure clamping**

operation of **clamps** (3.11) with a dynamic force in excess of 300 N for machines up to and including 1,6 m in width, or 500 N for machines greater than 1,6 m in width, when measured at 75 % of the clamp opening (e.g. with the clamp at 25 % of its maximum travel distance measured from the retracted position)

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

3.22**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

3.23

knife drive

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

3.24

laminator

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

3.25

low-pressure clamping

(for machines with (a) power-driven **clamp(s)** (3.11)) operation of clamps at a dynamic force not exceeding 300 N for machines up to and including 1,6 m in width, or 500 N force dynamic for machines greater than 1,6 m in width, when measured at 75 % of the clamp opening (with the clamp at 25 % of its maximum travel measured from the retracted position)

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

3.26

manual clamping

operation of **clamps** (3.11) in which the dynamic and static forces and motion of the clamp are directly supplied by the operator

3.27

paper drill

machine used to drill holes into piles of paper

3.28

paper-embossing machine

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

3.29

paper-finishing machine

apparatus used for applying liquid or solid coating material on a substrate made of paper or a similar material

3.30

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

3.31

sheet-folding machine

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

3.32

single-cycle device

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

NOTE See **anti-repeat device** (3.1).

3.33

stored energy

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

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4 Effective date

This part of ISO 12643 applies to new machines manufactured after December 31 of the year following the year of issue of this part of ISO 12643.

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 shall apply. See Annex A for a list of hazards associated with binding and finishing equipment and systems.

5.2 Safeguarding of crushing and shearing hazards

Automatic travel of movable components shall not create any significant mechanical hazards.

This can be achieved, for example, by limiting the force of the component movement. The following guidelines are suggested:

- a) 50 N or less where the likely contact surface of the guard is a blunt edge or projection and there is no risk of cutting or stabbing injuries; or
- b) 150 N or less where the likely contact surface of the guard is a plane such that there is no risk of a crushing injury.

Higher values can be chosen based upon risk analysis.

5.3 Interlocks <https://standards.iteh.ai/catalog/standards/sist/13d89831-3197-4fbf-a466-5335254de5f2/iso-12643-3-2008>

5.3.1 Exception for machine motion at inching speed

If a machine is operating at inching speed and under conditions defined in ISO 12643-1, motion may continue.

5.3.2 Exception for machine motion at production speed

This exception shall apply only to the specific machines identified in this part of ISO 12643, and does not apply to all equipment.

NOTE This exception might not comply with current European standards or the Machinery Directive.

There may be parts of the equipment that cannot be observed or adjusted with the guard closed, and it may be necessary for an authorized person to access this area with an interlocked guard open. Under these circumstances, alternative safety measures shall be taken. All adjustments shall be made from outside the hazardous area.

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 more than 2 min, the interlock on the guard shall be automatically reactivated and the equipment safety system shall stop machine motion.
- c) The bypassing means shall meet the requirements of category 3 of ISO 13849-1:1999.
- d) When adjustments are necessary, they shall be performed from outside the hazardous area.
- e) A warning label 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 provided with this alternative safety measure, information regarding its safe use shall be contained in the instruction handbook.

5.4 Guarding of hoppers and hopper feeders

5.4.1 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 5.4.4. The exception defined in 5.3.2 may be applied to the hopper feeder, if necessary.

5.4.2 Guarding of automatically fed hoppers

As an alternative to 5.4.1, 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 5.3.2 may be applied to the hopper feeder, if necessary.

5.4.3 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.

5.4.4 Separating elements on hopper feeders

Separating elements on feeders shall be so designed that their movement does not create hazard points.

This safeguarding can be accomplished, for example, by maintaining a distance of at least 25 mm or a force limit of 50 N between moving separating elements or between a moving element and a fixed object.

NOTE 1 Where blanks are fed from the bottom of a pile, safeguarding can be accomplished, for example, by residual-pile monitoring of feeders, which complies with category B of ISO 13849-1:1999.

The hazard points on separating elements outside the sidelays on feeders shall be safeguarded for every format size used. For hazard points within sidelays, residual-pile monitoring that complies with category B of ISO 13849-1:1999 shall be used.

NOTE 2 This safeguarding can be achieved, for example, by using accordion-type bellows or additional guards.

5.5 Guarding on binding and finishing machines

5.5.1 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.

NOTE 1 This requirement is satisfied, for example, by

- observing a maximum distance of 4 mm between the tools in the open position; or
- 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.

NOTE 2 The sensing device function, for example, can be based on the fact that the work piece and a body part have different electrical resistances or different thicknesses.

Hazard points are safeguarded if guards are provided in accordance with ISO 13852, or the machine can be started only by two-hand control.

For machines that are not guarded by a fixed or movable guard, a work-piece support shall be provided and two-hand controls, in accordance with ISO 12643-1 shall be used. If the work piece 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.

5.5.2 Hand-fed flat- and saddle-stitching machines

Adjustable guards shall be provided on flat-, saddle- and combined-stitching machines (see Figure 1 and Figure 2) for operational reasons. Instructions that describe the safe adjustment of the guards in a clear and easily understandable format shall be provided on the machine.

This marking requirement is satisfied, for example, by providing labels 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 2).

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

5.5.3 Gang stitchers and drum stitchers

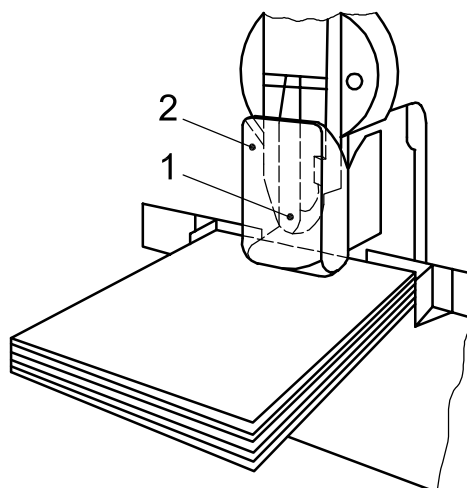
5.5.3.1 Feeders on gang stitchers and drum stitchers

Depending on the design, fixed guards, movable guards, residual pile monitoring or other means of guarding may be used (see Figure 3).

Where the bottom of the feeder on the transport channel side needs to remain open for functional reasons (see Figure 4), the lower edges of the guards on the transport channel side shall be extended as low as technically feasible.

EXAMPLE An example of a functional reason would be for the use of air vortexes.

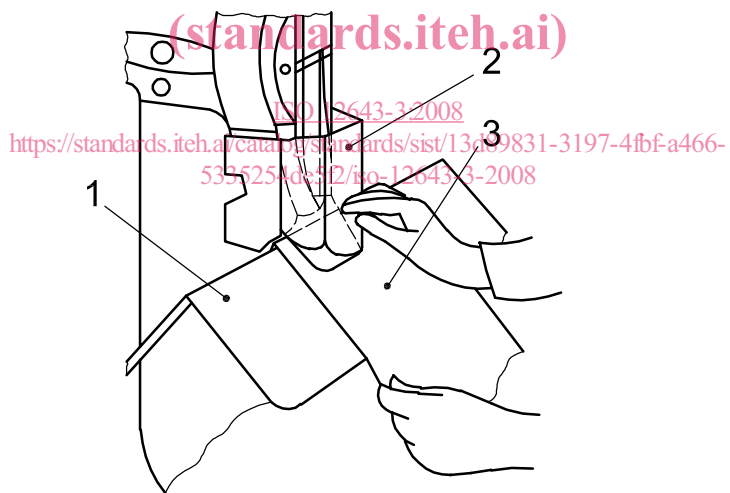
The exception defined in 5.3.2 may be applied to the feeder, if necessary.



- Key**
- 1 upper tool
 - 2 guard

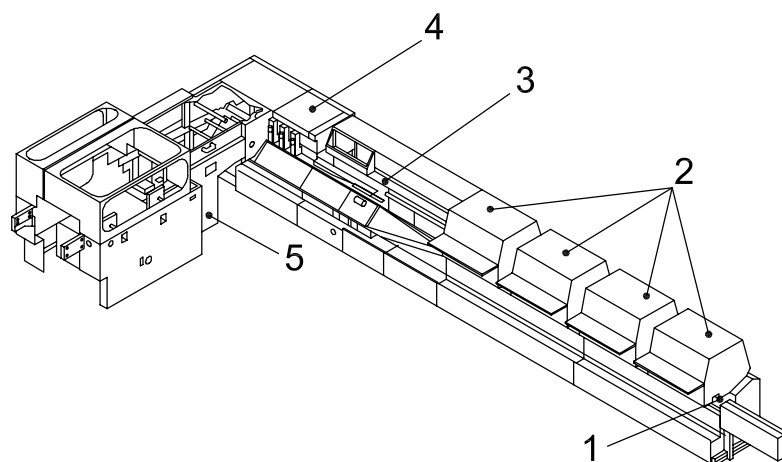
Figure 1 — Flat sticher

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- Key**
- 1 upper edge of saddle
 - 2 guard
 - 3 work piece

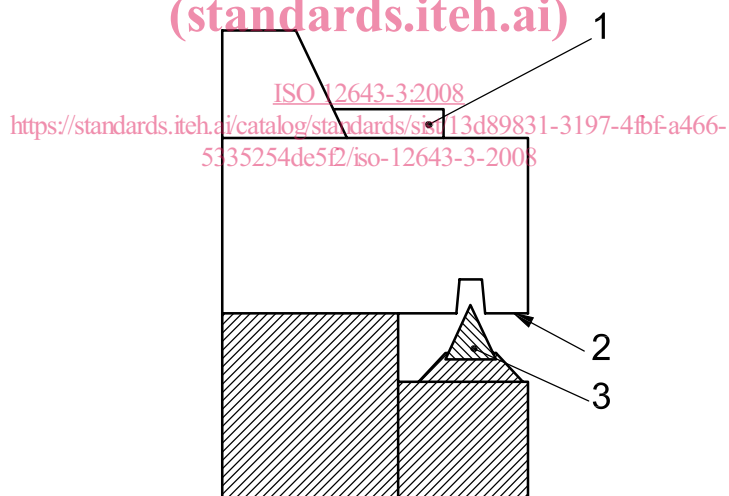
Figure 2 — Saddle sticher

**Key**

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

Figure 3 — Gang stitcher

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**Key**

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

Figure 4 — Feeder

5.5.3.2 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. Guard apertures shall be in accordance with ISO 13852.

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