BRITISH STANDARD

BS EN
1010-4:2004
+A1:2009

Safety of machinery — Safety requirements for the design and construction of printing and paper converting machines —

Part 4: Bookbinding, paper converting and finishing machines

ICS 37.100.10; 85.100

BSI
British Standards

National foreword

This British Standard is the UK implementation of EN 1010-4:2004+A1:2009. It supersedes BS EN 1010-4:2004 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by ⟩A1 A1⟨.

The UK participation in its preparation was entrusted by Technical Committee MCE/3, Safeguarding of machinery, to Subcommittee MCE/3/9, Paper and printing machines — Safety.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 5 February 2004

ISBN 978 0 580 62531 2

Amendments/corrigenda issued since publication

Date	Comments
31 July 2010	Implementation of CEN amendment A1:2009

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1010-4:2004+A1

October 2009

ICS 37.100.10; 85.100

Supersedes En 1010-4:2004

English Version

Safety of machinery - Safety requirements for the design and construction of printing and paper converting machines - Part 4: Bookbinding, paper converting and finishing machines

Sécurité des machines - Exigences de sécurité pour la conception et la construction de machines d'impressions et de transformation du papier - Partie 4: Machines à relier les livres, machines de transformation et de finition du papier

Sicherheit von Maschinen - Sicherheitsanforderungen an Konstruktion und Bau von Druck- und Papierverarbeitungsmaschinen - Teil 4: Buchbinderei, Papierverarbeitungs- und Papierveredelungsmaschinen

This European Standard was approved by CEN on 21 November 2003 and includes Amendment 1 approved by CEN on 15 September 2009.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 1010-4:2004+A1:2009: E

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Foreword

This document (EN 1010-4:2004+A1:2009) has been prepared by Technical Committee CEN/TC 198 “Printing and paper machinery - Safety”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2010, and conflicting national standards shall be withdrawn at the latest by April 2010.

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

This document includes Amendment 1 approved by CEN on 2009-09-15.

This document supersedes EN 1010-4:2004.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟦A1⟩ ⟨A1⟧.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

⟦A1⟩ For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A1⟧

Annex A of this standard is normative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This document is a type C standard as stated in EN 1070. It defines additional safety requirements and/or deviations from the stipulations in ▌A1⟩ EN 1010-1:2004+A1 ⟨A1▐.

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

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

The EN 1010 series of standards consists of the following parts:

Part 1 Common requirements

Part 2 Printing and varnishing machines including pre-press machinery

Part 3 Cutting machines

Part 4 Bookbinding, paper converting and finishing machines

Part 5 Machines for the production of corrugated board and machines for the conversion of flat and corrugated board

1 Scope

This document applies to

- bookbinding machines:
  - stitching, riveting, eyeletting and attaching machines;
  - gang stitchers;
  - gathering machines;
  - perfect binders;
  - paper drills;
  - book signature presses;
  - book presses;
  - sheet folding machines;
  - book production lines for the production of books with hard covers;
  - back rounding and pressing machines;

- backlining and head banding machines;
- casing-in machines;
- book cover crease forming machines.

— paper converting machines:

- machines for the production of envelopes;
- machines for the production of sanitary items;
- inserting machines;
- counter-stackers;
- paper embossing machines.

— paper finishing machines:

- coaters;
- laminators.

This document shall be used together with [A1] EN 1010-1:2004+A1 [A1]. Both parts together identify all significant hazards relevant to bookbinding, paper converting and paper finishing machines when they are used as intended and under the conditions foreseen by the manufacturer (see clause 4). The specific requirements in EN 1010-4 take precedence over respective requirements in [A1] EN 1010-1:2004+A1 [A1].

This document does not deal with risks generated by noise emitted from the machines. These issues are covered basically in [A1] EN 1010-1:2004+A1 [A1]. However, for machines like sheet folding machines and machines for the production of envelopes and sanitary items, some specific proposals for noise reduction measures are given.

This document is not applicable to bookbinding, paper converting and finishing machines manufactured before the date of publication of this document by CEN.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 292-1:1991, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology.*

EN 292-2:1991+A1:1995, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications.*

EN 294:1992, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs.*

EN 349:1993, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body.*

EN 626-1:1994, *Safety of machinery — Reduction of risks to health from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers.*

EN 626-2:1996, *Safety of machinery — Reduction of risks to health from hazardous substances emitted by machinery — Part 2: Methodology leading to verification procedures.*

EN 954-1:1996, *Safety of machinery — Safety related parts of control systems. Part 1: General principles for design*.

〈A1〉 EN 1010-1:2004+A1, *Safety of machinery — Safety requirements for the design and construction of printing and paper converting machines — Part 1: Common requirements.* 〈A1〉

prEN 1010-2:2003, *Safety of machinery — Safety requirements for the design and construction of printing and paper converting machines — Part 2: Printing and varnishing machines including pre-press machinery.*

EN 1010-3:2002, *Safety of machinery — Safety requirements for the design and construction of printing and paper converting machines — Part 3: Cutting machines.*

EN 1050:1996, *Safety of machinery — Principles for risk assessment.*

EN 1070:1998, *Safety of machinery — Terminology.*

EN 1539:2000, *Dryers and ovens in which flammable substances are released — Safety requirements.*

prEN 13023, *Noise measurement methods for printing, paper converting, paper making machines and auxiliary equipment — Accuracy categories 2 and 3.*

EN 61000-6-4:2002, *Electromagnetic compatibility (EMC) — Generic standards — Part 6-4: Emission standard for industrial environment (IEC 61000-6-4:1997).*

EN ISO 4871, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)..*

3 Terms and definitions

For the purposes of this European Standard, the definitions given in EN 1070:1998 and 〈A1〉 EN 1010-1:2004+A1 〈A1〉 and the following apply.

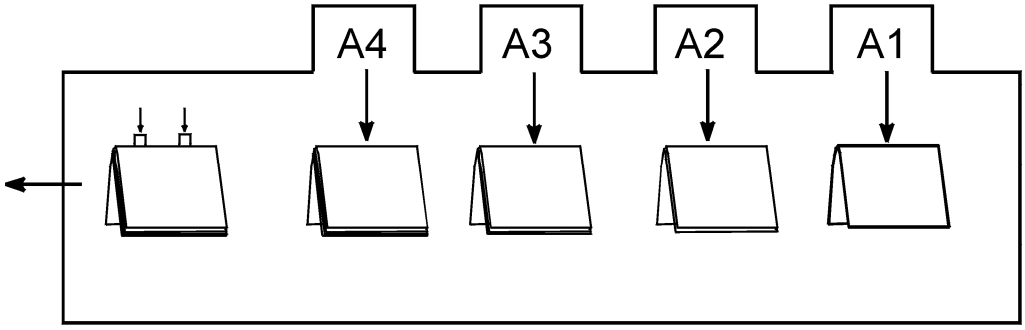
3.1
stitching, riveting, eyeletting and attaching machines
powered machines using tools for

— connecting material by means of metallic items

or

— positively fixing metallic items to material

3.2
gang stitchers
machines for stitching folded sheets of paper where 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 (see Figure 1)

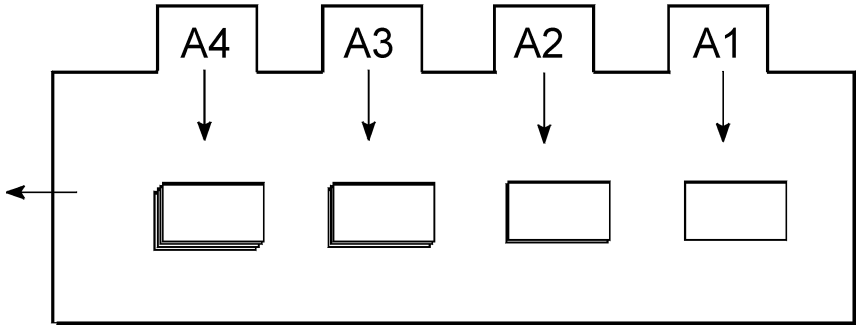


Key

A1 to A4 Feeding grippers

Figure 1 — Principle of a gang stitcher

3.3
gathering machines
machines for gathering folded sheets of paper where individual sheets are removed by feeding grippers and are stacked in the correct order on a transport chain (see Figure 2)



Key

A1 to A4 Feeding grippers

Figure 2 — Principle of a gathering machine

3.4
perfect binders
machines 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

3.5
paper drills
machines to drill holes into piles of paper

3.6
book signature presses
presses used for pressing book signatures: blocks are fed and aligned manually, pressing is power-operated

3.7
book presses
presses used for pressing books after manual binding in order to ensure dimensional stability

3.8
sheet folding machines
machines to apply single or multiple folds to single sheets of paper including cutting, perforating and creasing

3.9
book production lines
machines for the automatic production of books where book signatures consisting of gathered folded sheets or single sheets are put together and trimmed and provided with hard or flexible book covers

3.10
back rounding and pressing machines
machines for rounding book signature backs and completing the forming process by pressing the back

3.11
Back-lining and head banding machines
machines for the automatic production of books with rounded or flat book back where book signatures are glued, gauzed, back-lined and head banded

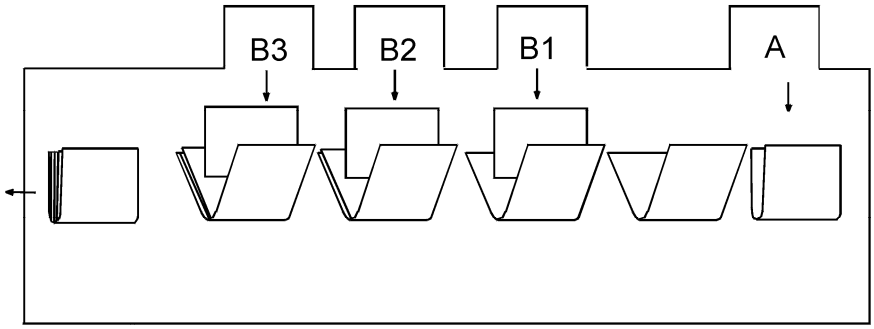
3.12
casing-in machines
machines for the production of books (hard cover) where rounded or flat book signatures are cased into hard or flexible book covers by gluing the end papers on the front and on the back of the book signatures to the inner sides of the book covers

3.13
book cover crease forming machines (presses)
machines for the production of books (hard cover) where, following the process of gluing book signatures to book covers, book cover creases are formed under heat and pressure and the books are pressed over the entire surface

3.14
machines for the production of envelopes
machines for the production of envelopes and other kinds of paper bags

3.15
machines for the production of sanitary items
machines for the production of sanitary items from paper, tissue and non-woven fabric such as, for example, paper handkerchiefs, paper napkins, tampons etc.

3.16
inserting machines
machines (for example attached to web-fed rotary printing presses) where printed matter such as leaflets and magazines are inserted at a predetermined position into other printed products, for example newspapers or magazines



Key

A feeder of main product,
B1 to B3 feeder of material to be inserted

Figure 3 — Principle of an inserting machine

3.17
counter-stackers
machines for cross-wise stacking of piles of leaflets, books, magazines or newspapers

3.18
paper embossing machines
machines for forming paper surfaces by using embossing cylinders

3.19
paper finishing machines
machines used for applying liquid or solid coating material on substrates made of paper or similar materials such as board and corrugated boards, plastic film, tinfoil, metal sheets and photo paper. Examples of paper finishing machines are coaters and laminators

3.19.1
coaters
type of paper finishing machine applying a liquid substance (for example glue, varnish, ink) of a predetermined thickness onto a substrate. For dosing the substance applied, a doctor blade (scraper) or the gap between two rollers (dosing gap) is used

3.19.2
laminators
type of paper finishing machine applying a solid material (for example foil, paper) onto a substrate

4 List of significant hazards

4.1 Insofar as they are dealt with in this standard, this clause contains all the significant hazards (noise is dealt with basically in ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧), that have been identified by the risk assessment process as being significant for this type of machinery and require action to eliminate or reduce the risk. When carrying out the risk assessment, the machine designer shall check whether the list of hazards in Table 1 is complete and applicable with respect to the particular machine.

4.2 It is of great importance that the user of this standard, i.e. the designer or manufacturer, takes into account the following basic aspects in accordance with EN 1050:

— the intended use of the machine including setting up (making ready), cleaning and maintenance, including foreseeable misuse;

— identification of all hazards existing on the machine.

Table 1 — Significant hazards, danger zones, safety measures

Significant hazards	Danger zone	Safety measures: reference to clauses in		
		this standard	EN 292-1: 1991	EN 1010-1: 2004+A1
Mechanical hazards crushing shearing cutting or severing entanglement drawing-in impacts	Machines with guards in open position	5.1.2	4.2.1	5.2.2.3
	Interfaces between individual machines	5.1.5, Annex A.1		
	Stitching, riveting, eyeletting and attaching machines			
	- between tools	5.2.1.1 to 5.2.1.3		5.2.8
	Gang stitchers			
	- feeder	5.2.2.1 to 5.2.2.3		5.3.4.8, 5.2.6.1.5
	- stitching section	5.2.2.4		
	- drawing-in zone on thickness control	5.2.2.5		
	- transport chain	5.2.2.7		
	- starting with guards open	5.2.2.8, 7.1.7		
	- trimmer	5.2.2.10		
	Gathering machines			
	- feeder	5.2.3.1 to 5.2.3.3		5.3.4.8 5.2.10.2
	- hand-feeder, transport chain	5.2.3.4		
	- gathering device (transport device)	5.2.3.5		
	- starting with guards open	5.2.3.7		
	Perfect binders			
	- book clamps	5.2.4.1		
	- gluing rollers	5.2.4.2		5.3.4.8
	- cover feeder	5.2.4.8		
	- delivery unit	5.2.4.9		
	- starting with guards open	5.2.4.11, 7.1.2.2		
	- milling head cutters	5.2.4.12, 7.1.2.1		
	Paper drills			
	- drill	5.2.5.1		
	- drill/clamp jaws	5.2.5.2		
	Book signature presses			
	- clamping plate/material	5.2.6		
	Book presses			
	- pressing plates	5.2.7.1, 5.2.7.2		5.2.10.2
	- pressing plates/machine enclosure	5.2.7.3		
	Sheet folding machines			
	- drawing-in zones of folding rollers	5.2.8.1		
	- cutting, creasing, perforating unit	5.2.8.2		
	- folding knife	5.2.8.3		
	- starting with guards open	5.2.8.4		
	Book production lines			
	- feed opening	5.2.9.1		
	- preheater, transport device	5.2.9.2		
	- pressing section	5.2.9.3		
	- glue section	5.2.9.4		
	- gauze section	5.2.9.6		
	- head banding section	5.2.9.7		5.2.1.1 b) 5.3.4.8
	- book cover magazine	5.2.9.8		
	- cover bending section	5.2.9.9		
	- casing-in section	5.2.9.10		
	- starting with guards open	5.2.9.11, 7.1.7		

Table 1 *(continued)*

Significant hazards	Danger zone	Safety measures: reference to clauses in this standard	EN 292-1: 1991	[A1] EN 1010-1: 2004+A1 [A1]
	Back rounding and pressing machines			
	- drawing-in zones of belts, transport chains, feed opening	5.2.10.1		
	- tipping section	5.2.10.2		
	- preheater	5.2.10.3		
	- pre-forming, back rounding, pressing sections	5.2.10.5		
	Backlining and head banding machines			
	- feed opening, belt feeding	5.2.11.1		
	- glue section, glue rollers	5.2.11.2		
	- gauze section	5.2.11.4		
	- head banding section	5.2.11.5		
	- pressing section	5.2.11.6		
	Casing-in machines			
	- transport finger	5.2.12.1		
	- book cover feeder	5.2.12.2		5.3.4.8
	- cover bending section	5.2.12.3		
	- forming section	5.2.12.4		
	- casing-in, gluing section	5.2.12.6		
	- pressing section	5.2.12.7		
	- delivery unit, delivery opening	5.2.12.8		
	Book cover crease forming machine			
	- feed and delivery openings	5.2.13.1		
	- tipping section, transport devices	5.2.13.2		
	- pressing section	5.2.13.3		
	- starting with guards open	5.2.13.5, 7.1.7		
	Machines for the production of envelopes			
	- reel unwinding unit	5.3.1.1		
	- feeder	5.3.1.2		5.3.5
	- printing unit	5.3.1.3.1, 5.3.1.3.2		5.3.4.8
	- longitudinal and cross scoring	5.3.1.4.1, 5.3.1.4.2		5.2.1.1
	- form cutting section	5.3.1.5		5.3.2.1
	- guide rollers	5.3.1.6.1, 5.3.1.6.2		
	- window cutting section	5.3.1.7		
	- window material conveying section	5.3.1.8.1to 5.3.1.8.4		
	- scraper gluing unit	5.3.1.9.1, 5.3.1.9.2		5.2.1.1
	- separating cutting unit	5.3.1.10.1 to 5.3.1.10.3		5.2.1.1
	- bottom flap folding section	5.3.1.11.1, 5.3.1.11.2		
	- transport rolls	5.3.1.12.1, 5.3.1.12.2		5.2.1.1
	- staggering wheel	5.3.1.13.1, 5.3.1.13.2, 7.1.3.1		5.2.1.1 b)
	- roller gluing unit	5.3.1.14.1to 5.3.1.14.4, 7.1.3.3		5.2.1.1
	- hot air dryers	5.3.1.15.1, 5.3.1.15.2		5.2.1.1
	- separation roller before aligner section	5.3.1.16		5.2.1.1
	- aligner section	5.3.1.17		
	- seal flap folding section	5.3.1.18		
	- separating disc delivery	5.3.1.19.1, 5.3.1.19.2		
	- starting with guards locked open	5.3.1.20.1, 7.1.7, 5.3.1.20.2, 7.1.4.1		5.2.3.4
	Machines for the production of sanitary items			
	- reel unwinding unit	5.3.2.1.1 to 5.3.2.1.4		5.3.5.1
	- smoothing and embossing section	5.3.2.2.1, 5.3.2.2.2		5.2.1.1
	- longitudinal cutting section	5.3.2.3		5.3.2

Table 1 *(continued)*

Significant hazards	Danger zone	Safety measures: reference to clauses in		
		this standard	EN 292-1: 1991	EN 1010-1: 2004+A1
	- longitudinal folding section	5.3.2.4		
	- waste suction devices on cutting devices	5.3.2.5		
	- counting and transfer section	5.3.2.6		
	- product checking section	5.3.2.7		5.2.1.1
	- delivery unit	5.3.2.8.1, 7.1.4.2		
	- starting with guards open	5.3.2.9.1, 7.1.7, 5.3.2.9.2, 7.1.4.1		
	Inserting machines			
	- feeder	5.3.3.1, 5.3.3.2		5.3.4.8
	- transport device/drive elements	5.3.3.3		
	- starting with guards open	5.3.3.5, 7.1.5		
	Counter-stackers			
	- drawing-in zones of belts	5.3.4.1		
	- waste separator	5.3.4.2		
	- turntable	5.3.4.3		
	- delivery units	5.3.4.4		
	- stored energy (pneumatic system)	5.3.4.5		
	Paper embossing machines			
	- danger zones of web threading device	5.3.5.2		5.2.3.5
	- reel unwinding, rewinding units	5.3.5.3		5.3.5
	- guide rollers	5.3.5.4		5.2.1.1
	- stretch roller	5.3.5.5		
	- drawing-in zone of embossing roller/counter roller	5.3.5.6		
	- movement of counter roller	5.3.5.7, 7.1.5		5.2.3.2 a) 2)
	- rotary knives	5.3.5.9		
	Coaters			
	- danger zones of web threading device	5.4.1.2		
	- reel unwinding, rewinding units	5.4.1.3		5.3.5
	- guide rollers	5.4.1.4		
	- dosing gap	5.4.1.5		
	- coating unit	5.4.1.8		
	- engagement and disengagement of rollers	5.4.1.9		
	- drawing-in zones of belts	5.4.1.10		
	- continuous flow dryers	5.4.1.13.2,		
	- entire machine	5.4.1.13.5, 5.4.1.13.6, 7.1.6.3		
	Foil laminators			
	- reel unwinding, rewinding units	5.4.2.1.1		5.3.5
	- manual feeding	5.4.2.1.2		
	- guide rollers	5.4.2.1.3, 5.4.2.1.4		5.2.1.1
	- engagement and disengagement of laminating rollers	5.4.2.1.5		
	- drawing-in zones of laminating rollers	5.4.2.1.6		5.2.1.1
	- cutting unit	5.4.2.1.8		
	Laminators with glue application			
	- danger zones of web threading device	5.4.2.2.2		
	- reel unwinding, rewinding units	5.4.2.2.3		5.3.5
	- feeder, delivery unit	5.4.2.2.4		5.3.4
	- drawing-in zones of belts	5.4.2.2.5		
	- guide rollers	5.4.2.2.6		5.2.1.1
	- tear-resistant material web	5.4.2.2.7		
	- rotary knife	5.4.2.2.8		5.3.2
	- transport rolls	5.4.2.2.9		
	- glue unit	5.4.2.2.10		
	- laminating rollers	5.4.2.2.11, 5.4.2.2.12		5.2.3.2 a) 2)

Table 1 *(continued)*

Significant hazards	Danger zone	Safety measures: reference to clauses in this standard	EN 292-1: 1991	[A1] EN 1010-1: 2004+A1 [A1]
	- sheeter - pressing belt - package stop, conveyor belt - turning belt	5.4.2.2.13 5.4.2.2.14, 5.4.2.2.15 5.4.2.2.16 5.4.2.2.17		5.2.1.1 a)
Avoiding direct or pending hazardous situations	Gang stitchers Gathering machine Perfect binders Sheet folding machines Book production lines Back rounding and pressing machines Backlining and head banding machines Casing-in machines Book cover crease forming machines Machines for the production of envelopes Machines for the production of sanitary items Inserting machines Counter-stackers Paper embossing machines Coaters Foil laminators Laminators with glue application	5.2.2.6, 5.2.2.9 5.2.3.6, 5.2.3.8 5.2.4.10,5.2.4.13 5.2.8.6 5.2.9.12, 5.2.9.13 5.2.10.6 5.2.11.7 5.2.12.9 5.2.13.6 5.3.1.21, 5.3.1.23 5.3.2.11, 5.3.2.12 5.3.3.4, 5.3.3.6 5.3.4.6 5.3.5.1, 5.3.5.10 5.4.1.1, 5.4.1.15 5.4.2.1.9 5.4.2.2.19		5.2.7.2 5.2.7.2 5.2.7.2 5.2.7.2 5.2.7.2 5.2.7.2 5.2.7.2
Electrical hazards Direct or indirect contact	Electrical equipment of all machines	5.1.3	4.3	5.2.5
Thermal hazards Burns due to possible contact	Perfect binders - hotmelt glue reservoirs Book production lines - preheating section Back rounding and pressing machines - preheater Backlining and head banding machines - hotmelt Casing-in machines - heated forming section Book cover crease forming machines (press) - heated crease forming rails Machines for the production of envelopes - hot air nozzles, hot parts of machine Paper embossing machines - heated embossing roller Coaters - hot liquid material - continuous flow dryer Foil laminators - heated laminating rollers	5.2.4.6 5.2.9.2, 7.1.8 5.2.10.4, 7.1.8 5.2.11.3, 7.1.8 5.2.12.5, 7.1.8 5.2.13.4, 7.1.8 5.3.1.15.3 5.3.5.8, 7.1.8 5.4.1.6 5.4.1.13.4 5.4.2.1.7	4.4	5.2.14 5.2.14 5.2.14 5.2.14 5.2.14 5.2.14

Table 1 *(concluded)*

Significant hazards	Danger zone	Safety measures: reference to clauses in		
		this standard	EN 292-1: 1991	EN 1010-1: 2004+A1
Hazards generated by noise e. g. resulting in hearing loss (deafness)	Sheet folding machines Machines for the production of envelopes Machines for the production of sanitary items	5.2.8.5 5.3.1.22 5.3.2.10	4.5	
Hazards generated by radiation UV radiation, laser	Perfect binders - radiation dryers (UV- HF-dryers)	5.2.4.7	4.7	5.2.16.2
Hazards from fire and explosion	Machines for the production of sanitary items Coaters Laminators with glue application	5.3.2.5 5.4.1.11, 5.4.1.13.1, 7.1.6.2, 5.4.1.13.3 5.4.2.2.18	4.8	5.2.4
Hazards from substances and materials used for processing, machine operation or which are emitted during the process Hazards resulting from contact with or inhalation of harmful fluids, gases, fumes, dusts	Perfect binders - polyurethane hotmelt Book production lines - hotmelt Coaters - hazardous substances	5.2.4.3 to 5.2.4.5, 7.1.2.3 5.2.9.5 5.4.1.7, 7.1.6.1	4.8	
Hazards generated by neglect of ergonomic principles in machine design unhealthy body postures	Stitching, riveting, eyeletting and attaching machines - adjustments Book production lines - glue replenishment	5.2.1.2 5.2.9.4	4.9	8
Failure, malfunction of control system Faults or failures in safety circuits	Control systems of all machines Stitching, riveting, eyeletting, attaching machines Gathering machines Perfect binders Paper drills Machines for the production of sanitary items Water jet knives Inserting machines, residual pile monitoring	5.1.4 5.2.1.1, 5.2.1.4 5.2.3.1, 5.2.3.4 5.2.4.8 5.2.5.2 5.3.2.8.2 5.3.3.1		5.2.6.1 5.2.6 5.2.6.1.5, 5.2.10.1 5.2.6.1.5 5.2.8 5.2.6.2.1 5.2.6.1.5

5 Safety requirements and/or measures

5.1 General

5.1.1 Machinery shall comply with the safety requirements and/or protective measures of this clause. In addition, the machine shall be designed according to the principles of EN 292 for hazards that are relevant but not significant and that are not dealt with by this document (e. g. sharp edges of machine frame).

The common requirements of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ shall also be satisfied.

5.1.2 Guards that have to be removed frequently or for making ready shall be interlocked with the hazardous movement in accordance with 5.2.2.3 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.1.3 The electrical equipment shall comply with the requirements of 5.2.5 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.1.4 The safety-related control circuits shall comply with the requirements of 5.2.6.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.1.5 Where machines are set up to form integrated lines (production lines) with one overall control system, annex A.1 shall be applied.

5.2 Bookbinding machines

5.2.1 Stitching, riveting, eyeletting and attaching machines (with manual feeding)

5.2.1.1 Danger zones between tools on stitching, riveting, eyeletting and attaching machines (see Figure 4) shall be avoided or safeguarded.

This requirement is satisfied 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 and a higher closing force is allowed to become effective only after it has been ensured by means of a sensing device that there is no part of a human body present between the two tools.

The sensing device may, for example, function on the basis of the difference in electrical resistance between the workpiece and parts of the body or the difference in thickness. Control systems shall comply at least with category B of EN 954-1:1996.

Danger zones are safeguarded if

— guards are provided with apertures and safety distances in accordance with Table 4 of EN 294:1992

or

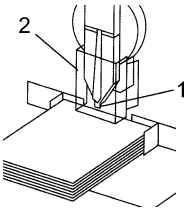
— the machine can only be started by two-hand control. A device shall be provided for supporting and fixing the product to be processed. Two-hand controls shall comply with the requirements specified in 5.2.8 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.2.1.2 On flat and saddle stitching machines (see Figures 4 and 5) and on combined flat and saddle stitching machines, adjustable guards are required for operational reasons. Where power-operated movable guards are used, the requirements of 5.2.2.4 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ shall be satisfied.

Adjustable guards shall extend to the product surface for flat stitching and to the upper edge of the lower tool for saddle stitching. The upper tool shall be enclosed snugly by the guard.

Instructions that describe the safe adjustment of the guards in a clear and easily understandable form shall be provided on the machine. This requirement is satisfied by labels provided with sketches and dimensional data, for example, for identifying the guard adjustment required for a specific stitching thickness.

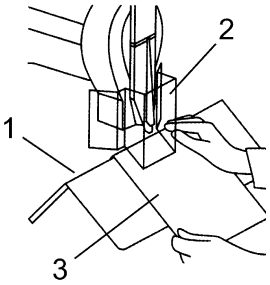
The required information on this in the instruction handbook is given in 7.1.1.



Key

1 Upper tool
2 Guard

Figure 4 — Flat stitching



Key

1 Upper edge of saddle
2 Guard
3 Workpiece

Figure 5 — Saddle stitching

5.2.1.3 For machines that can only be started by two-hand control, 5.2.8 of ⟦A1⟩ EN 1010-1:2004+A1 ⟦A1⟧ shall apply. A workpiece support is required.

If the shape or size of the workpiece requires the operator to use both hands to hold the workpiece outside the danger zone or if the workpiece needs to be held outside the danger zone with one hand, a hold-to-run control shall be provided for starting the machine instead of the two-hand control.

5.2.1.4 Safety-related control circuits shall comply with 5.2.6 of ⟦A1⟩ EN 1010-1:2004+A1 ⟦A1⟧.

5.2.2 Gang stitchers

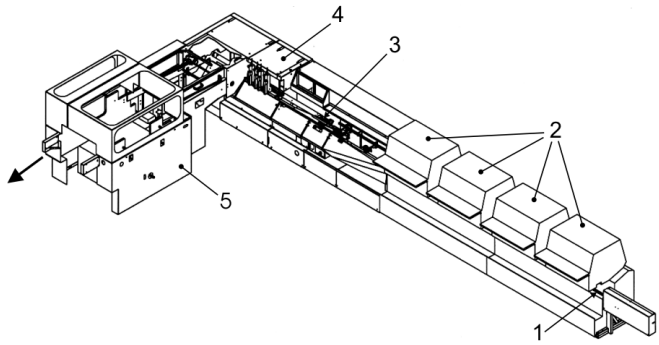
5.2.2.1 When gang stitcher feeding hoppers are fed manually, the danger zones of the separating elements of the feeder shall be safeguarded in accordance with 5.3.4.8 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ and the residual risk monitoring device designed in accordance with 5.2.6.1.5 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.2.2.2 With automatic feeding of the feeding hopper, tunnel-type guards with a safety distance of 550 mm from the nearest danger zone shall be provided instead of the measures specified in 5.2.2.1

5.2.2.3 The feeder shall be provided with fixed guards on all sides or with guards interlocked with the hazardous movement.

In the sheet-feeding area (transport chain side), the feeder shall be guarded in order to prevent direct access to the danger zones from the transport chain side. Where transport chains cannot be entirely enclosed for functional reasons (e.g. where air vortexes are used) (see Figure 7), the lower edges of the guards on the transport chain side shall be extended as low as technically feasible.

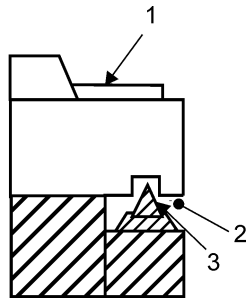
5.2.2.4 Danger zones of the stitching section shall be safeguarded by guards interlocked with the hazardous movement on the operator side, otherwise by fixed guards or guards interlocked with the hazardous movement. Guard apertures on the in-running side of the stitching unit may be adequately guarded by elastic material (e.g. brushes).



Key

1 Transport chain
2 Feeder
3 Thickness control
4 Stitching unit,
5 Trimmer (three-knife trimmer)

Figure 6 — Gang stitcher



Key

1 Manual feeding
2 Bottom of feeder
3 Transport chain

Figure 7 — Feeder

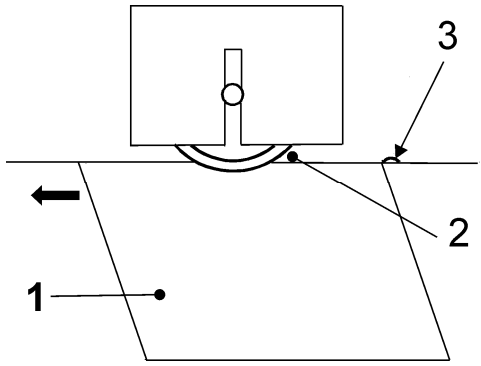
5.2.2.5 Where a drawing-in zone exists in the calliper roll used for thickness control (see Figure 8), one of the following requirements shall be applied:

— maximum clamping force of 50 N or

— displacement of at least 20 mm or

— guard.

5.2.2.6 Gang stitchers shall be provided with a start-up warning device according to 5.2.7.2 of A1 EN 1010-1:2004+A1 A1.



Key

1 Folded sheets
2 Drawing-in zone of calliper roll
3 Gripper

Figure 8 — Calliper roll for thickness control

5.2.2.7 A safety distance of at least 25 mm is required between transport chain grippers and fixed machine parts.

5.2.2.8 Starting the machine with the interlocking guards in the open position and with a hold-to-run speed higher than 10 m/min shall be possible only by means of two-hand control and only if

— zones with restricted view and mutual interlocking as described in 5.2.3.4 of [A1] EN 1010-1:2004+A1 [A1] are provided and

— a selector switch for this kind of operation is provided and

— the hold-to-run speed is the slowest speed possible under procedural requirements.

For further information in the instruction handbook, see 7.1.7.

5.2.2.9 An emergency stop system shall be provided with emergency stop buttons located on each main control panel. In the area of the feeders, emergency stop buttons shall be provided at 5 m intervals.

5.2.2.10 The three-knife trimmer shall be safeguarded according to 5.5 of prEN 1010-3:2002.

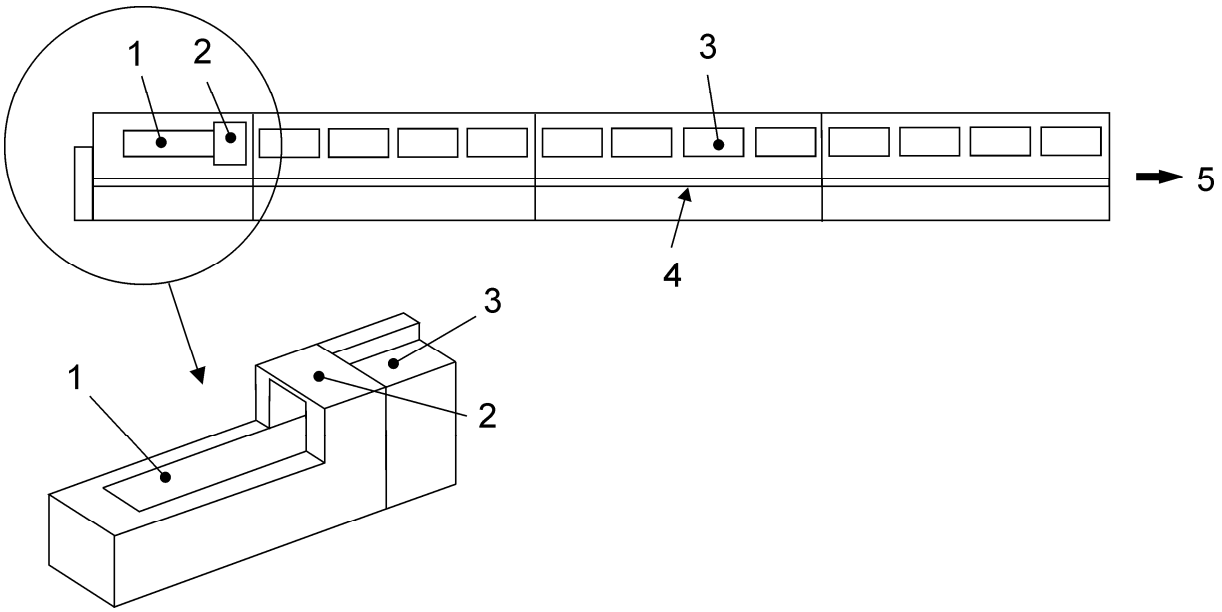
When the interlocking guard is opened, it shall only be possible to start the trimmer by means of two-hand controls. Operation of the two-hand control shall allow only a single stroke of the knives.

5.2.3 Gathering machines

5.2.3.1 With manual feeding of the feeders, the danger zones of the separating elements of the feeder shall be safeguarded in accordance with 5.3.4.8 of [A1] EN 1010-1:2004+A1 [A1] and the residual pile monitoring device shall be provided in accordance with 5.2.6.1.5 of [A1] EN 1010-1:2004+A1 [A1].

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

5.2.3.3 With automatic feeding of the feeding hopper, tunnel-type guards with a safety distance of 550 mm from the nearest danger zone shall be provided instead of the measures required in 5.2.2.1.



Key

1 Manual feeding
2 Tunnel
3 Feeder
4 Gathering device (transport device)
5 Direction of following machine

Figure 9 — Gathering machine (plan view)

5.2.3.4 For safeguarding the danger zones 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 adhered to, trip bars shall be used for safeguarding. The requirements of 5.2.10.1 (category 3) and 5.2.10.2 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ shall be met.

Danger zones that can be reached from the manual feeding section in the following feeder shall be safeguarded by fixed or tunnel-type guards interlocked with the hazardous movement of a minimum length of 300 mm (see Figure 9, item 2).

5.2.3.5 Danger zones on the gathering device (transport device) (see Figure 9, item 4) shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement.

5.2.3.6 Gathering machines shall be provided with a start-up warning device in accordance with 5.2.7.2 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.2.3.7 Starting the machine with the interlocking guards in the open position and with a speed higher than 10 m/min shall be possible only by means of two-hand control and only if

— zones with restricted view and mutual interlocking as described in 5.2.3.4 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ are provided and

— a selector switch for this kind of operation is provided and

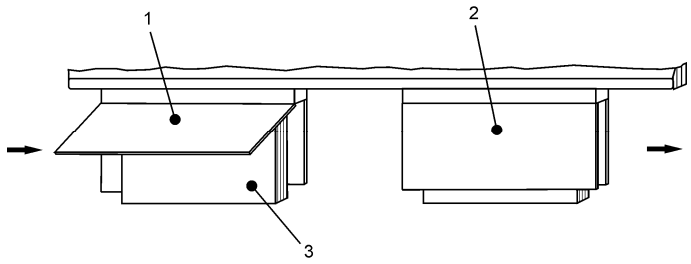
— the hold-to-run speed is the slowest speed possible under procedural requirements.

For further information in the instruction handbook, see 7.1.7.

5.2.3.8 An emergency stop system shall be provided with emergency stop buttons located at least on each main control panel. In the area of the feeders, emergency stop buttons shall be provided at 5 m intervals.

5.2.4 Perfect binders (Figure 11)

5.2.4.1 The danger zones existing between the book clamps and between book clamps and machine frame as well as during cover pressing shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement. For guard apertures, the safety distances specified in Table 4 of EN 294:1992 shall be applied.

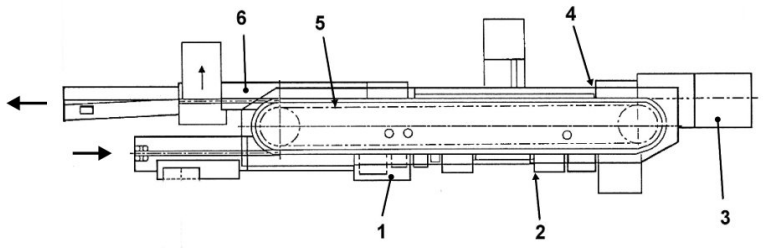


Key

1 Book clamps open
2 Book clamps closed
3 Book signature

Figure 10 — Book clamps

5.2.4.2 The danger zones existing in the gluing unit (glue rollers, glue applicators) and the danger zones between book backs and/or between book clamps and glue rollers and fixed machine parts shall be protected by fixed guards or by guards interlocked with the hazardous movement.



Key

1 Milling unit
2 Gluing unit
3 Cover feeder
4 Pressing unit
5 Book clamps
6 Delivery

Figure 11 — Perfect binder (plan view)

5.2.4.3 The glue pans for hotmelt shall be provided with temperature control and with limit temperature monitoring. Any hotmelt vapour shall be extracted from the perfect binder and from outside the machine for premelters where tight covers cannot be provided.

5.2.4.4 Perfect binders using polyurethane hotmelt glues for binding shall be designed so that there are no hazardous concentrations of isocyanates emitted from the machine over the entire process (preheating, processing, cleaning). These requirements are met if the isocyanate vapours and isocyanate aerosols are extracted.

The requirements of EN 626-1:1994 and EN 626-2:1996 shall be met.

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 over the roof without risk to the environment. The minimum volume of exhaust air shall not be less than 500 m³/h.

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.

5.2.4.5 Where the risk of isocyanate vapours cannot be entirely excluded when removing the glue pan from the perfect binder or during cleaning of the glue pan, respirator masks with adequate filters shall be provided.

Where the risk of splashing cannot be entirely avoided when handling polyurethane hotmelt glues, adequate protective glasses and suitable gloves shall be provided.

For further information in the instruction handbook and residual risks when handling polyurethane, see 7.1.2.3.

5.2.4.6 Contact with hot surfaces of the hotmelt pan shall be prevented by guards in accordance with 5.2.14 of [A1] EN 1010-1:2004+A1 [A1].

5.2.4.7 Where UV radiation dryers are used, the limit values of emitted radiation shall comply with 5.2.16.2 of [A1] EN 1010-1:2004+A1 [A1]; for HF dryers, the limit values as specified in clause 9 of EN IEC 61000-4-6:2002 shall be complied with.

5.2.4.8 The danger zones on the separating elements of the cover feeder shall be safeguarded in accordance with 5.3.4.8 of [A1] EN 1010-1:2004+A1 [A1] and the residual pile monitoring device shall be provided in accordance with 5.2.6.1.5 of [A1] EN 1010-1:2004+A1 [A1].

Where the machine operates with automatic feeding, tunnel-type guards with a safety distance of 550 mm to the nearest danger zone is required as a deviation from 5.2.2.1.

5.2.4.9 At the delivery unit, it shall be ensured that danger zones in the perfect binder (book clamps) cannot be accessed. For safeguarding, a fixed guard or a tunnel-type guard interlocked with the hazardous movement may be provided. The safety distance to the danger zone shall be at least 550 mm.

5.2.4.10 Perfect binders with a length of 7 m or more shall be provided with a start-up warning device according to 5.2.7.2 of [A1] EN 1010-1:2004+A1 [A1].

5.2.4.11 Starting the machine with the interlocking guards in the open position and with a hold-to-run speed higher than 10 m/min shall be possible only by means of two-hand control and only if

— zones with restricted view and mutual interlocking as described in 5.2.3.4 of [A1] EN 1010-1:2004+A1 [A1] are provided and

— a selector switch for this kind of operation is provided and

— the hold-to-run speed is the slowest speed possible under procedural requirements.

Where functional circumstances require the cover to be fed manually during setting-up of the perfect binder, the machine shall be capable of being started only under hold-to-run control with a maximum speed of 10 m/min when the guards are in the open position.

For further information in the instruction handbook, see 7.1.2.2.

5.2.4.12 If production circumstances prevent the milling head cutter being stopped when the interlocking guard covering the book clamps is opened, the following measures shall be applied:

— access to the milling head cutter shall be prevented as far as possible by additional guards (for example movable guards over the milling head cutters that can be pushed open, vertical guards in front of the milling head knives),

— a warning sign shall be supplied in the vicinity of the milling head cutter.

For further information in the instruction handbook, see 7.1.2.1.

5.2.4.13 An emergency stop system shall be provided with emergency stop buttons located on each main control panel at 5 m intervals.

5.2.5 Paper drills

5.2.5.1 On paper drills with manual feeding, the stroke of the drill or workpiece to be processed shall be under hand- or foot-operated hold-to-run control or manually operated. When the hold-to-run control (actuator or hand or foot pedal) is released, the drill or workpiece shall immediately return to its start position.

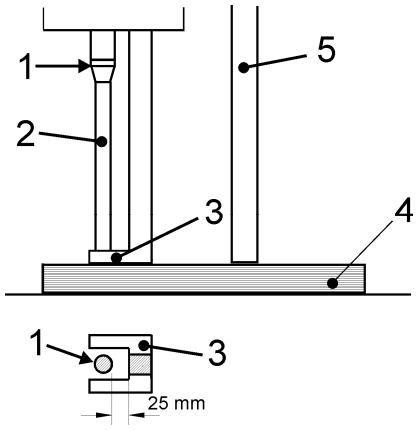
A hold-down device (see Figure 12) shall be provided to fix the product firmly while guarding persons against unintended contact. The distance between the hold-down device and the chuck jaw shall be at least 25 mm (see Figure 12).

5.2.5.2 On multi-drill machines, the danger zones of the chuck jaws and the drills shall be safeguarded by

— a guard interlocked with the hazardous movement (see Figure 12, item 5)

or

— a two-hand control in accordance with 5.2.8 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧.



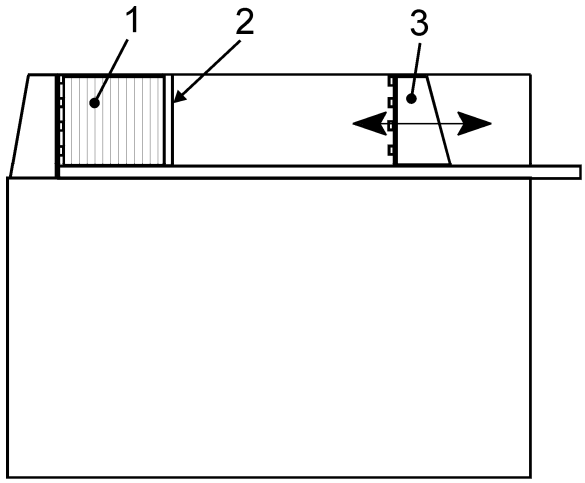
Key

1 Chuck jaws
2 Drill
3 Hold-down device
4 Material
5 Guard

Figure 12 — Paper drill

5.2.6 Book signature presses

5.2.6.1 On book signature presses (see Figure 13), movement of the pressing plate in the direction of the material (danger zone between pressing plate and the inserted material or the inserted intermediate plate) shall only be possible under hold-to-run control.



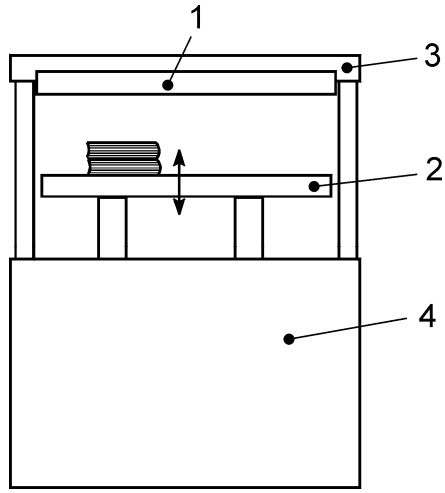
Key

1 Book signature
2 Intermediate plate
3 Pressing plate

Figure 13 — Book signature press

5.2.7 Book presses

5.2.7.1 The danger zone between the movable and the fixed pressing plate (see Figure 14) or the forming bar, if any, shall be safeguarded. If the movement is automatic, it may be safeguarded by a trip bar. Tripping of the bar shall stop the upward movement of the pressing plate. Trip devices shall satisfy the requirements of 5.2.10.1, first sentence, and 5.2.10.2 of A1 EN 1010-1:2004+A1 A1.



Key

1 Trip device
2 Movable pressing plate
3 Fixed pressing plate
4 Machine enclosure

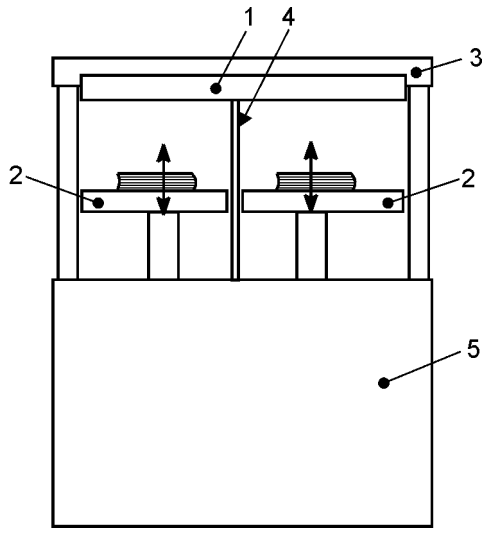
Figure 14 — Book press

5.2.7.2 On book presses where several pressing plates can be moved individually, the danger zones existing between the movable pressing plates require additional safeguarding by fixed, bend-resistant guards with a smooth surface without apertures and grooves (see Figure 15, item 4).

The clearance between guard and moving pressing plates shall not exceed 6 mm.

5.2.7.3 The danger zone between the movable pressing plate (bottom) and the machine enclosure shall be safeguarded by a minimum distance of 120 mm in accordance with EN 349:1992.

5.2.7.4 An emergency stopping device shall be provided with an emergency stop button located on the operator side.



Key

1 Trip bar
2 Movable pressing plate
3 Fixed pressing plate
4 Guard
5 Machine enclosure

Figure 15 — Book press with two movable pressing plates

5.2.8 Sheet folding machines (Figure 16)

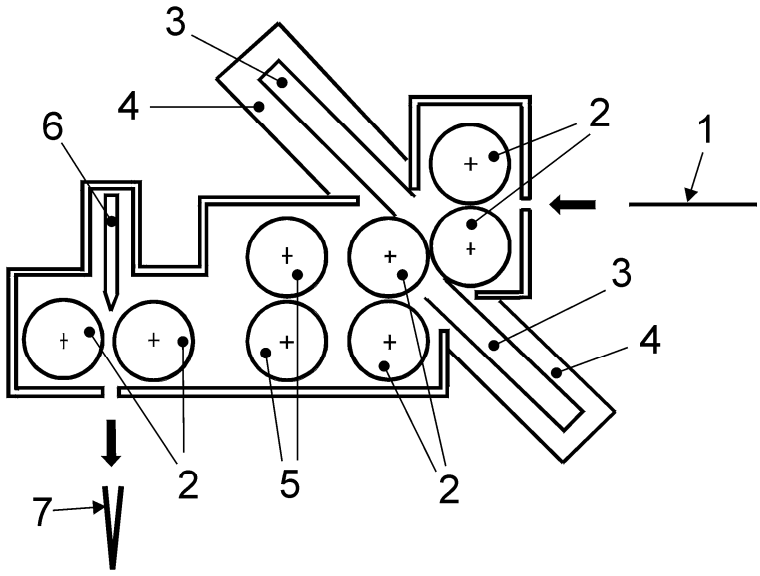
5.2.8.1 The drawing-in zones of the folding rollers shall be protected by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1. of [A1] EN 1010-1:2004+A1 [A1].

Adjustments shall be made either from outside the guards or through guard openings, in which case further safeguarding needs to be provided to prevent access to danger zones.

Safeguarding is also allowed by using the folding bucket or a guide plate as a guard if this ensures complete safety.

5.2.8.2 Danger zones of the cutting, creasing and perforating devices shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement.

5.2.8.3 The crushing zones between the folding knife and folding rollers shall be protected by fixed guards or by guards interlocked with the hazardous movement.



Key

1 Unfolded sheet
2 Folding rollers
3 Buckle plates
4 Sound enclosure
5 Cutting, creasing device
6 Folding knife
7 Folded sheet

Figure 16 — Sheet folding machine

5.2.8.4 As a deviation from [A1] EN 1010-1:2004+A1 [A1], starting the machine with the interlocking guards in the open position and at production speed shall be possible only by means of two-hand control and only if

— zones with restricted view and mutual interlocking as described in 5.2.3.4 of [A1] EN 1010-1:2004+A1 [A1] are provided and

— a selector switch for this kind of operation is provided.

For further information in the instruction handbook, see 7.1.7.

5.2.8.5 Noise reduction measures (see also [A1] EN 1010-1:2004+A1 [A1]) shall be applied to the sheet folding machines, e.g. by the provision of noise enclosures. Adequate noise reduction may be provided by using noise enclosures for the lower and upper buckle plates, for example.

5.2.8.6 An emergency stop device shall be provided with emergency stop buttons on each operator panel.

5.2.9 Book production lines for the production of hard cover books

5.2.9.1 Access from the feeding aperture to any danger zone in the machine shall be prevented. Depending on the design of the aperture, the appropriate safety distance as specified in Table 4 of EN 294:1992 shall be applied.

5.2.9.2 The danger zones on the preheater created by preheating rollers and the transport device shall be protected by fixed guards or by guards interlocked with the hazardous movement.

Where the preheater is accessible after opening the interlocking guard, pictogram warning of hot parts shall be provided in the vicinity of the preheater.

For further information in the instruction handbook, see 7.1.8.

5.2.9.3 The danger zones on the back rounding and pressing sections (danger zones created by pressing formes, transport device) shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.2.9.4 The danger zones in the glue sections (drawing-in zones between glue rollers, drawing-in zones between book signatures and glue rollers) shall be protected by fixed guards or by guards interlocked with the hazardous movement according to 5.2.1.1 a) of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

Safe glue replenishment should be possible during the production run, for example by piped systems or the possibility of replenishment from outside the safety devices.

5.2.9.5 Where hotmelt is used, the hotmelt pans shall be provided with temperature control and limit temperature monitoring.

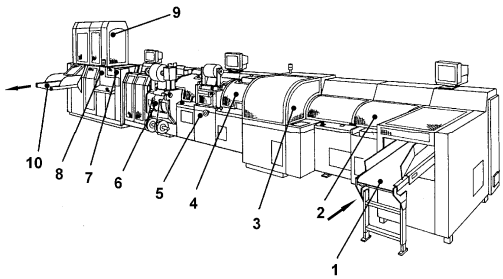
5.2.9.6 The cutting and crushing hazards caused by the knife and the gauze clamps in the gauze section shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement. Drawing-in zones on rollers (gauze unwinding section) shall be safeguarded in accordance with 5.2.1.1 b) of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.2.9.7 The shearing and crushing zones inside the head banding and backlining section and cutting hazards caused by head banding knife and rotary knives on the unwinding section of the head banding and backlining section shall be protected by fixed guards or by guards interlocked with the hazardous movement. The drawing-in zones of the rollers (unwinding section) shall be safeguarded in accordance with 5.2.1.1 b) of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.2.9.8 Danger zones caused by the separating elements of the book cover feeder and the transport device shall be safeguarded in accordance with 5.3.4.8 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.2.9.9 Crushing zones on the cover bending and rounding sections (for example danger zones created by rollers, transport devices) shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.2.9.10 Crushing and shearing zones of the casing-in section (for example danger zones created by transport devices, rollers) shall be protected by fixed guards or by guards interlocked with the hazardous movement.



Key

1 Feeding belt
2 Preheater
3 Back rounding and pressing section
4 Gluing section
5 Gauzing section
6 Head banding and backlining section
7 Book cover feeder
8 Cover bending and rounding section
9 Casing-in section
10 Delivery belt

Figure 17 — Production line for the production of hard-cover books

5.2.9.11 Starting the machine with the interlocking guards in the open position and with a hold-to-run speed higher than 10 m/min shall be possible only by means of two-hand control and only if

— zones with restricted view and mutual interlocking as described in 5.2.3.4 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ are provided and

— a selector switch for this kind of operation is provided and

— the hold-to-run speed is the slowest speed possible under procedural requirements and does not exceed 20 m/min.

For further information in the instruction handbook, see 7.1.7.

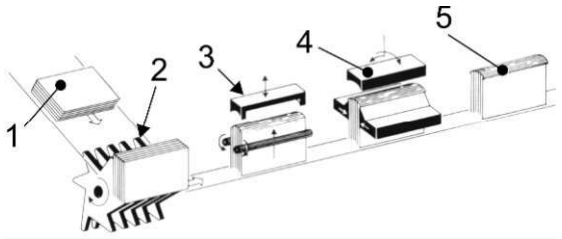
NOTE Hold-to-run control speeds in production lines differ due to cycle variations so that a continuous machine speed may result in individual elements having higher speeds at the various stages of the process.

5.2.9.12 Emergency stop buttons shall be provided on each main control panel.

5.2.9.13 Book production lines shall be provided with a start-up warning device in accordance with 5.2.7.2 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.2.10 Back rounding and pressing machines

5.2.10.1 Drawing-in zones of the feed and delivery belts shall be safeguarded. Access from feed or delivery openings to any danger zone inside the machine shall be prevented. A safety distance of at least 550 mm shall be maintained from the opening to the nearest danger zone.



Key

1 Feeding of book signatures
2 Tipping of book signatures
3 Preforming section
4 Back rounding and pressing section
5 Delivery unut

Figure 18 — Back rounding and pressing section (principle)

5.2.10.2 The crushing and shearing zones of the tipping section (see Figure 18, item 2) shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.2.10.3 Danger zones created by transport devices on the preheating section shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.2.10.4 Where the preheater is accessible after opening an interlocking guard, pictograms with warnings of hot parts shall be provided in the vicinity of the preheater (see 5.2.14 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩).

For further information in the instruction handbook, see 7.1.8.

5.2.10.5 The crushing zones of the preforming, back rounding and pressing sections (see Figure 18, items 3 and 4) shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.2.10.6 Emergency stop buttons shall be provided on each main control panel.

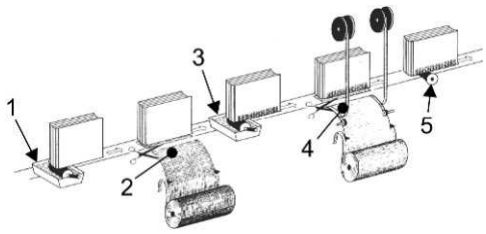
5.2.11 Backlining and head banding machines

5.2.11.1 During the transport of book signatures between vertically mounted conveyor belts, the drawing-in zone between the two conveyor belts on the feeding side shall be safeguarded by a tunnel-type guard. Between the tunnel feed opening and the drawing-in zone, a safety distance of at least 550 mm shall be ensured.

5.2.11.2 At the glue sections (see Figure 19, items 1 and 3), the drawing-in zones of the glue rollers shall be protected by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1].

5.2.11.3 Contact with hot machine parts shall be prevented by fixed guards or by movable guards in accordance with 5.2.14 of [A1] EN 1010-1:2004+A1 [A1]. Where glue pans are accessible after the guards have been opened, the machine shall be provided with signs warning of hot parts.

For further information in the instruction handbook, see 7.1.8.



Key

1 Glue section
2 Gauzing section
3 Glue section
4 Head banding section
5 Counter-pressure section

Figure 19 — Backlining and head banding machine (principle)

5.2.11.4 The cutting zone of the gauze cutting knife (see Figure 19, item 2) shall be protected by fixed guards. The drawing-in zones of the rollers of the gauze section (unwinding unit) shall be safeguarded in accordance with 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1].

5.2.11.5 The crushing and shearing zones inside the head banding section (see Figure 19, item 4) and the cutting zones of the cutting knife and at the rotary knives on the unwinding unit of the head banding section shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.2.11.6 The danger zones at the counter-pressure sections (see Figure 19, item 5) shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.2.11.7 An emergency stop system shall be provided with emergency stop buttons on each main control panel.

5.2.12 Casing-in machines

5.2.12.1 The danger zones between the book transport fingers and fixed parts of the machine shall be protected by fixed guards or by guards interlocked with the hazardous movement. Feed and delivery openings shall have a safety distance of at least 550 mm.

5.2.12.2 The danger zones of the separating elements and the transport devices of the book cover feeder shall be safeguarded in accordance with 5.3.4.8 of A1 EN 1010-1:2004+A1 A1.

5.2.12.3 Roller drawing-in zones of the cover bending section (see Figure 20, item 3) shall be protected by fixed guards or by guards interlocked with the hazardous movement.

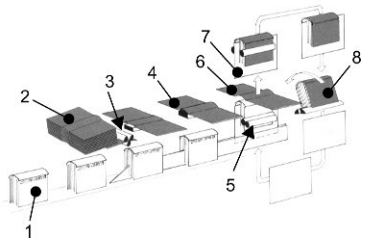
5.2.12.4 The crushing and drawing-in zones in the heated forming section (see Figure 20, item 4) shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.2.12.5 Where hot parts are accessible after the interlocking guards have been opened, pictograms with warnings of hot parts shall be provided in the vicinity of these points (see 5.2.14 of A1 EN 1010-1:2004+A1 A1).

For further information in the instruction handbook, see 7.1.8.

5.2.12.6 The crushing zones in the casing-in section (see Figure 20, item 6) and the drawing-in zones in the gluing section (see Figure 20, item 5) shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.2.12.7 The drawing-in zones and the crushing zones in the counter-pressure section (see Figure 20, item 7) shall be protected by fixed guards or by guards interlocked with the hazardous movement.



Key

1 Feed
2 Book cover feeder
3 Cover bending section
4 Forming section
5 Gluing section
6 Casing-in section
7 Counter-pressure section
8 Delivery

Figure 20 — Casing-in machine (principle)

5.2.12.8 The crushing and shearing points of the transport device in the delivery unit (see Figure 20, item 8) shall be protected by fixed guards or by guards interlocked with the hazardous movement. A safety distance of at least 550 mm shall be maintained between the delivery opening and the nearest danger zone.

5.2.12.9 Emergency stop buttons shall be provided on each main control panel.

5.2.13 Book cover crease forming machines (presses)

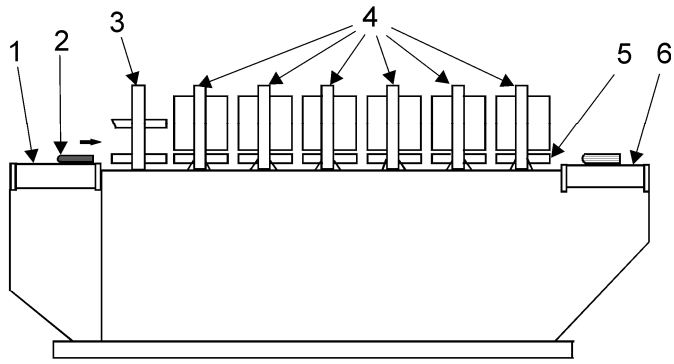
5.2.13.1 Access shall not be possible to any danger zone inside the machine from feed and delivery openings on the feed and delivery belts (see Figure 21, items 1 and 6). When designing feed and delivery openings, a safety distance of at least 550 mm shall be maintained.

5.2.13.2 The crushing zones created by the tipping and transport device in the tipping section (see Figure 21, item 3) shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.2.13.3 The crushing zones in the pressing section (e.g. between books and crease forming devices) shall be protected by fixed or interlocking guards (see Figure 21, item 4).

5.2.13.4 Pictograms warning of hot parts (see 5.2.14 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩) shall be provided in the vicinity of the heated book cover crease forming devices which are accessible behind interlocking guards (see 5.2.14 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩)..

For further information in the instruction handbook, see 7.1.8.



Key

1 Feeding belt
2 Book signature
3 Tipping section
4 Pressing section
5 Crease forming rail
6 Delivery belt

Figure 21 — Book cover crease forming machine (press)

5.2.13.5 Starting the machine with the interlocking guards in the open position and with a hold-to-run speed higher than 10 m/min shall be possible only by means of two-hand control and only if

— zones with restricted view and mutual interlocking as described under 5.2.3.4 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ are provided and

— a selector switch for this kind of operation is provided and

— the hold-to-run speed is the slowest speed possible under procedural requirements, but does not exceed 20 m/min.

For further information in the instruction handbook, see 7.1.7.

NOTE If lower hold-to-run speeds are used, the book in the machine may burn.

5.2.13.6 An emergency stop system shall be provided with emergency stop buttons on each main control panel.

5.3 Paper converting machines

5.3.1 Machines for the production of envelopes

5.3.1.1 The requirements for reel stands shall comply with 5.3.5 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.3.1.2 The requirements for feeders shall comply with 5.3.4.8 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.3.1.3 Printing unit

5.3.1.3.1 The drawing-in zones of the printing unit shall be safeguarded by a guard interlocked with the hazardous movement in accordance with 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1].

After opening the interlocking guard, the printing cylinder and/or impression cylinder shall only be allowed to continue running if the following requirements are met:

The drawing-in zone between the printing cylinder and impression cylinder shall be safeguarded by a fixed guard according to 5.2.1.1.b) of [A1] EN 1010-1:2004+A1 [A1]. The openings provided on both sides of the guard for introducing the gauge to measure the distance between impression cylinder and printing cylinder shall have a maximum width of 35 mm and a maximum height of 20 mm. A warning sign shall be provided indicating that EN 294 is not complied with. The speed is restricted to 6 m/min measured at the circumference of the largest cylinder.

For further information in the instruction handbook, see 7.1.3.4.

NOTE 1 The guard opening is required for introducing a gauge while the machine is at standstill in order to set the distance precisely between the printing cylinder and impression cylinder.

NOTE 2 Rollers/cylinders are required to continue running after the interlocking guard has been opened in order to prevent the ink from drying up on the rollers.

5.3.1.3.2 After actuation of the emergency stop button, the printing cylinder and impression cylinder are allowed to continue running if the requirements of 5.3.1.3.1, second paragraph, are fulfilled.

5.3.1.4 Longitudinal and cross scoring section

5.3.1.4.1 The drawing-in zones and cutting points in the cross scoring section shall be safeguarded by guards interlocked with the hazardous movement.

5.3.1.4.2 The rotary knives for longitudinal scoring shall be safeguarded according to 5.3.2.1 of [A1] EN 1010-1:2004+A1 [A1].

5.3.1.5 Form cutting section

The danger zones of the knife shall be protected by guards interlocked with the hazardous movement. Feed and delivery apertures shall be designed to maintain the safety distances according to Table 4 of EN 294:1992.

5.3.1.6 Driven guide rollers (e.g. after the form cutting section, window cutting section)

5.3.1.6.1 Drawing-in zones of guide rollers shall be protected by fixed guards. On guide rollers where the paper guide rails reach from the feeding to the delivery point, the height of the aperture on the in-running side shall not exceed 10 mm and the safety distance shall be at least 15 mm.

For trouble-shooting, it shall be possible to remove the paper guide rails without dismantling the guard.

5.3.1.6.2 On the delivery side, the guard shall reach down to at least half the height of the guide roller in order to allow for the removal of paper if the format size changes or web breaks while avoiding the creation of new drawing-in zones between guard and guide roller.

5.3.1.7 Window cutting section

The danger zone of the knife in the window cutting section shall be protected by a guard interlocked with the hazardous movement. Apertures on the feeding and the delivery sides shall be designed to comply with the safety distances specified in Table 4 of EN 294:1992.

5.3.1.8 Window material conveying section with unwinding unit

5.3.1.8.1 Drawing-in zones shall be protected by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧. When designing feed and delivery openings for the material, a safety distance in accordance with Table 4 of EN 294:1992 shall be maintained.

5.3.1.8.2 The unwinding roller shall be designed as a smooth-surface roller so that there is no risk of trapping or entanglement.

5.3.1.8.3 The drawing-in zone between the unwinding shaft and shaft bearing shall be safeguarded by a guard interlocked with the hazardous movement in accordance with 5.2.1.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧.

5.3.1.8.4 The cutting and crushing zones of the splicer knife shall be protected by fixed guards or guards interlocked with the hazardous movement

5.3.1.9 Scraper gluing unit

5.3.1.9.1 The drawing-in zones between the rollers of the gluing unit shall be safeguarded by fixed guards or guards interlocked with the hazardous movement in accordance with 5.2.1.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧.

5.3.1.9.2 Gluing units that can be lifted shall be secured safely in the lifted position by a self-locking device. The lifting movement shall be interlocked with the machine drive creating the hazardous movement. These locking devices may, for example, be latches or self-locking spindles.

5.3.1.10 Separating cutting section

5.3.1.10.1 The danger zones of the knives shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement.

5.3.1.10.2 The segment roller shall be safeguarded by fixed guards or guards interlocked with the hazardous movement. The feeding aperture shall be designed according to the requirements of Table 4 of EN 294:1992

5.3.1.10.3 Where the delivery aperture on the segment roller cannot be designed to comply with the safety distances specified in Table 4 of EN 294:1992 due to the provision of subsequent machine parts required for reliable paper transport, the opening shall be as small as possible and the safety distance shall be as great as technically feasible.

NOTE Direct access is generally prevented by the subsequent machine parts.

5.3.1.11 Bottom flap folding section

5.3.1.11.1 The drawing-in zone between the bottom flap folding rollers shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧. Where the feeding aperture cannot be designed to comply with the safety distances of Table 4 of EN 294:1992, the aperture shall be as small as possible and the safety distance as great as technically feasible.

5.3.1.11.2 The delivery aperture shall be designed to comply with the safety distances of Table 4 of EN 294:1992.

5.3.1.12 Transport rolls

5.3.1.12.1 Drawing-in zones of the transport rolls shall be safeguarded by fixed guards in accordance with 5.2.1.1 b) of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧.

5.3.1.12.2 Where the diameter of the transport rolls is 40 mm or less, the drawing-in zone is adequately safeguarded if they can be displaced at least 10 mm.

5.3.1.13 Staggering wheel

5.3.1.13.1 The danger zones between the staggering wheel and parts of the machine shall be safeguarded by fixed guards. Where gaps are provided between individual staggering wheels, the outer surfaces of the staggering wheels shall be smooth in order to reduce the risk of trapping.

NOTE Staggering wheels are used for staggering (separating) the envelopes.

5.3.1.13.2 Drawing-in zones between the paper guide supports and the staggering wheel shall be avoided by providing a minimum distance of 25 mm. Where this is not possible, a trip bar shall be provided which is tripped as soon as a finger is drawn in between the paper guide supports and the staggering wheel.

For further information in the instruction handbook, see 7.1.3.1.

5.3.1.14 Roller gluing unit

5.3.1.14.1 The drawing-in zones shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧. Where the feeding aperture cannot be designed to comply with the safety distances of Table 4 of EN 294:1992, the aperture shall be as small as possible and the safety distance as great as technically feasible.

NOTE Direct access to the drawing-in zone is prevented by the staggering wheel located directly in front of the unit.

5.3.1.14.2 The drawing-in zone between the dosing roller and duct roller (see Figure 23) shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧. Where scrapers are used instead of dosing rollers, the drawing-in zone between the scraper and duct roller may be designed out by arranging the scraper so that it is close to 90° to the duct roller surface and they are never more than 4 mm apart, even when the scraper is withdrawn (see Figure 24).

5.3.1.14.3 The drawing-in zone between the duct roller and applicator roller (see Figures 23 and 24) shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧.

5.3.1.14.4 Actuation of an emergency stop button shall not lead to stopping of the dosing roller and the duct roller if all the danger zones are safeguarded.

NOTE The dosing roller and duct roller are required to continue running in order to prevent drying out of the glue.

For further information in the instruction handbook, see 7.1.3.3.

5.3.1.15 Hot air dryers

5.3.1.15.1 Drawing-in zones of belts shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement.

5.3.1.15.2 On power-operated tilting nozzles, the crushing zones shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement.

5.3.1.15.3 Where access to hot machine parts is possible, the requirements of 5.2.14 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧ shall be met.

5.3.1.16 Separation roller before aligner section

The drawing-in zone shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧. Where the feeding aperture cannot be designed to comply with the safety distances of Table 4 of EN 294:1992, the aperture shall be as small as possible and the safety distance as great as technically feasible.

NOTE Direct access is generally prevented by preceding parts.

5.3.1.17 Aligner section

The drawing-in zones shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧.

5.3.1.18 Seal flap folding section

The danger zone between the two seal flap folding rollers shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement. Where the feeding aperture cannot be designed to comply with the safety distances of Table 4 of EN 294:1992, the aperture shall be as small as possible and the safety distance as great as technically feasible.

NOTE Direct access is generally prevented by following machine elements (transport rolls).

5.3.1.19 Separating disc delivery

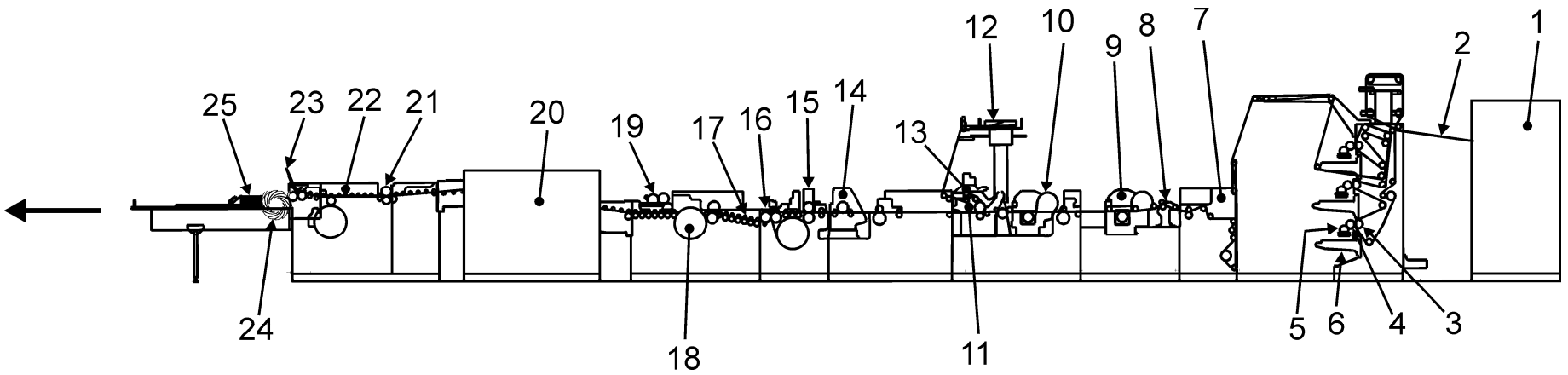
5.3.1.19.1 The drawing-in zone between the separating disc and the roller located in front of the disc shall be safeguarded by providing

a) fixed side guides covering the drawing-in zones so as to prevent access by the fingers. In addition, fixed guards shall be provided on the two outer separating discs in order to prevent unintentional access to the discs from the sides.

NOTE The layout of the separating discs generally prevents any unintentional access to drawing-in zones.

or

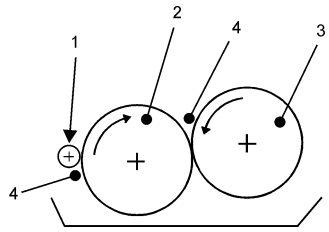
b) a guard interlocked with the hazardous movement covering the separating disc with a delivery opening of the maximum width required for processing the largest format size. The height of the delivery opening shall not exceed 220 mm. The safety distance between the delivery opening and the separating disc shall be at least 550 mm.



Key

1	Unwinding unit	14	Separating cutting section
2	Paper web	15	Segment roller
3	Counter-pressure roller	16	Bottom flap folding section
4	Printing cylinder	17	Rubber transport rolls
5	Impression cylinder	18	Staggering wheel
6	Printing unit	19	Roller gluing unit
7	Cross scoring section	20	Hot air dryer
8	Longitudinal scoring section	21	Separation roller
9	Form cutting section	22	Aligner section
10	Window cutting section	23	Seal flap folding section
11	Window material conveying section	24	Separating disc delivery
12	Window material unwinding unit	25	Envelopes
13	Scraper gluing unit		

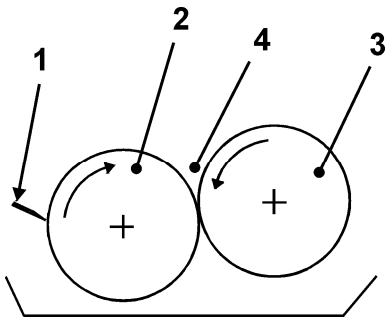
Figure 22 — Envelope making machine



Key

1 Dosing roller
2 Duct roller
3 Applicator
4 Drawing-in zone

Figure 23 — Roller gluing unit with dosing roller



Key

1 Scraper
2 Duct roller
3 Applicator
4 Drawing-in zone

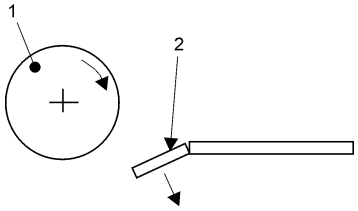
Figure 24 — Roller gluing unit with scraper on the duct roller

5.3.1.19.2 The danger zone between the separating discs and the delivery table shall be safeguarded.

Safeguarding can be provided, for example, by

— a minimum safety distance of 25 mm between the two parts or

— a hinged flap to the table of at least 25 mm width giving way in a downwards direction when forces of more than 50 N are applied.



Key

1 Separating disc
2 Hinged table flap

Figure 25 — Hinged table flap

5.3.1.20 Starting the machine with interlocking guards open

5.3.1.20.1 Starting the machine with the interlocking guards in the open position and with a hold-to-run speed higher than 10 m/min shall be possible only by means of two-hand control and only if

— zones with restricted view and mutual interlocking as described under 5.2.3.4 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧ are provided and

— a selector switch for this kind of operation is provided and

— the hold-to-run speed is the slowest speed possible under procedural requirements.

For further information in the instruction handbook, see 7.1.7.

5.3.1.20.2 Starting the machine with the interlocking guards in the open position for fault-finding and trouble-shooting by means of a stroboscope shall only be possible under hold-to-run control and only if

— zones with restricted view and mutual interlocking as described under 5.2.3.4 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧ are provided and

— a lockable selector switch for this kind of operation is provided and

— time control is provided to limit the time to a maximum of 2 min and

— the hold-to-run speed is the slowest speed possible under procedural requirements.

For further information in the instruction handbook, see 7.1.3.2.

5.3.1.21 An emergency stop system shall be provided with emergency stop buttons located at least on each main control panel and a maximum of 5 m apart.

5.3.1.22 Noise reduction measures (see also ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧) shall be provided on the machine, for example sound hoods, particularly on the folding sections in order to avoid health risks.

5.3.1.23 Envelope machines shall be provided with a start-up warning device in accordance with 5.2.7.2 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧.

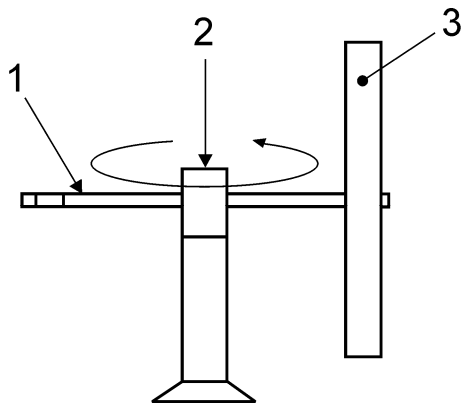
5.3.2 Machines for the production of sanitary items

5.3.2.1 Reel unwinding unit

5.3.2.1.1 The drawing-in zone between the belt drive and material reel shall be safeguarded according to 5.3.5.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧.

5.3.2.1.2 In order to prevent the unwinding drive belt from dropping down unintentionally, overridable safety rated check valves shall be provided on the lifting cylinders of the belt.

5.3.2.1.3 The horizontal turret of the unwinding unit (Figure 26) shall be moved only manually or under hold-to-run control with a maximum speed of 5 m/min.



Key

1 Unwinding axis
2 Rotating axis
3 Material reel

Figure 26 — Horizontal turret

5.3.2.1.4 The distance between the dancer roller and the limit stop shall be at least 120 mm during the production run. The limit stop shall have flexible padding.

5.3.2.2 Smoothing and embossing section

5.3.2.2.1 The drawing-in zones of the stretch rollers and between the upper and lower smoothing rollers shall be protected by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1]. This also applies to the drawing-in zones on the delivery side between the upper smoothing rollers and fixed machine parts and between the lower smoothing rollers and fixed machine parts. Feed and delivery openings shall be designed to comply with the safety distances in Table 4 of EN 294:1992.

5.3.2.2.2 Danger zones of the embossing rollers shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement. Feed and delivery openings shall be designed to comply with the safety distances in Table 4 of EN 294:1992.

5.3.2.3 Longitudinal cutting section

The rotary knives shall be safeguarded according to 5.3.2 of [A1] EN 1010-1:2004+A1 [A1].

5.3.2.4 Longitudinal folding section

Automatic format setting shall only be possible under hold-to-run control with a maximum speed of 3 m/min. It shall be possible to observe the danger zones from the point of operation of the hold-to-run control

5.3.2.5 Waste suction devices on cutting devices

Waste suction pipes shall fulfil the requirements of [A1] EN 1010-1:2004+A1 [A1].

5.3.2.6 Counting and transfer section

Drawing-in zones and crushing zones shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement.

5.3.2.7 Product checking section

Drawing-in zones of the belt shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1]. Where the feeding aperture cannot be designed to comply with the safety distances in Table 4 of EN 294:1992, the aperture shall be as small as possible and the safety distance as great as technically feasible. Direct access shall be prevented by fixed guards preventing inadvertent access to danger zones.

5.3.2.8 Delivery unit

5.3.2.8.1 On machines using a band saw, the cutting edge of the band saw on the delivery side shall be safeguarded by

— a tunnel-type guard with safety distance of 550 mm measured from the delivery opening,

— adjustable tunnel height and width to take account of the format size.

For further information in the instruction handbook, see 7.1.4.2.

5.3.2.8.2 In order to ensure safe access to water jet knives for trouble-shooting and maintenance, control systems relating to safety of the water jet knives and interruption of the water supply shall be rated for increased control requirements according to 5.2.6.2.1 of [A1] EN 1010-1:2004+A1 [A1].

5.3.2.9 Starting the machine with interlocking guards open

5.3.2.9.1 Starting the machine with the interlocking guards in the open position and with a hold-to-run speed higher than 10 m/min shall be possible only by means of two-hand control and only if

— zones with restricted view and mutual interlocking as described in 5.2.3.4 of [A1] EN 1010-1:2004+A1 [A1] are provided and

— a selector switch for this kind of operation is provided and

— the hold-to-run speed is the slowest speed possible under procedural requirements.

For further information in the instruction handbook, see 7.1.7.

5.3.2.9.2 Starting the machine with the interlocking guards in the open position and with a hold-to-run speed higher than 10 m/min for fault-finding and trouble-shooting by means of a stroboscope shall be possible only under hold-to-run control and only if

— zones with restricted view and mutual interlocking as described in 5.2.3.4 of [A1] EN 1010-1:2004+A1 [A1] are provided and

— a lockable selector switch for this kind of operation is provided and

— a time control is provided to limit the time to a maximum of 2 min and

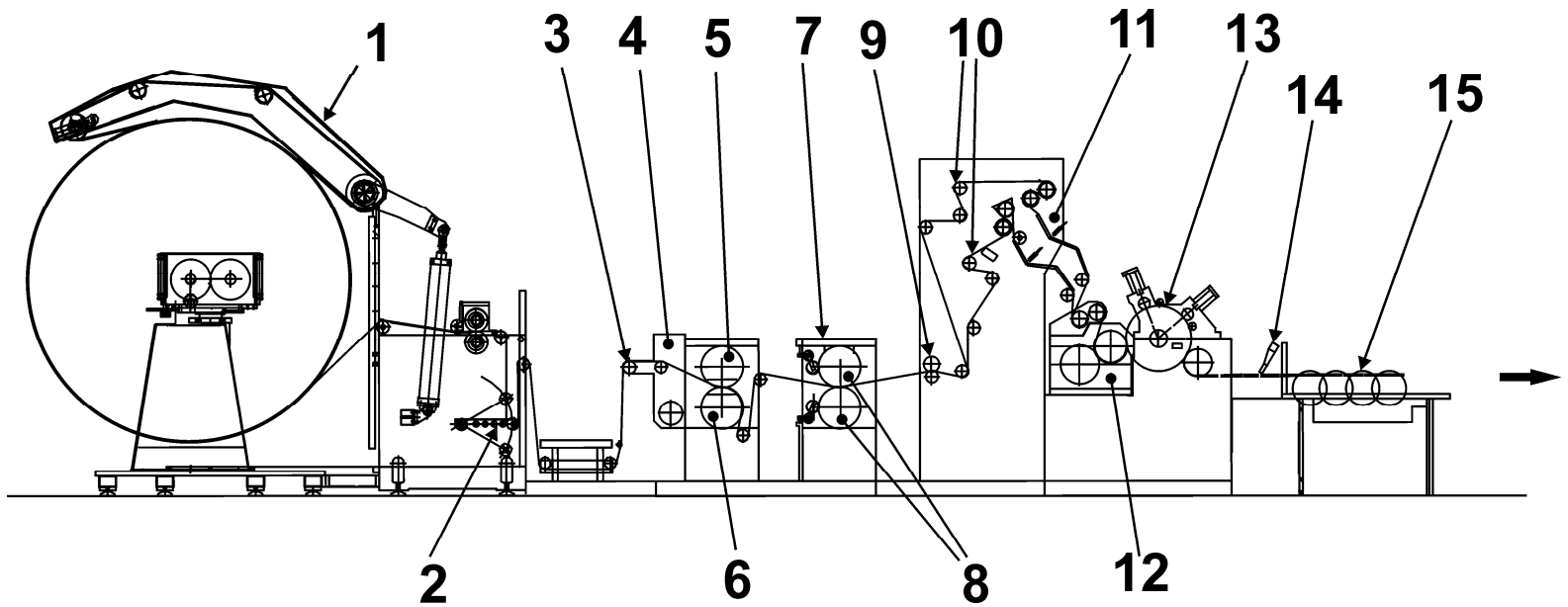
— the hold-to-run speed is the slowest speed possible under procedural requirements.

For further information in the instruction handbook, see 7.1.4.1.

5.3.2.10 Noise reduction measures (see also [A1] EN 1010-1:2004+A1 [A1]) shall be taken especially in the cutting and folding sections, for example by using sound hoods, in order to avoid risks to health.

5.3.2.11 Emergency stop buttons shall be provided on each main control panel a maximum of 5 m apart.

5.3.2.12 Machines for the production of sanitary items shall be provided with a start-up warning device in accordance with 5.2.7.2 of [A1] EN 1010-1:2004+A1 [A1].



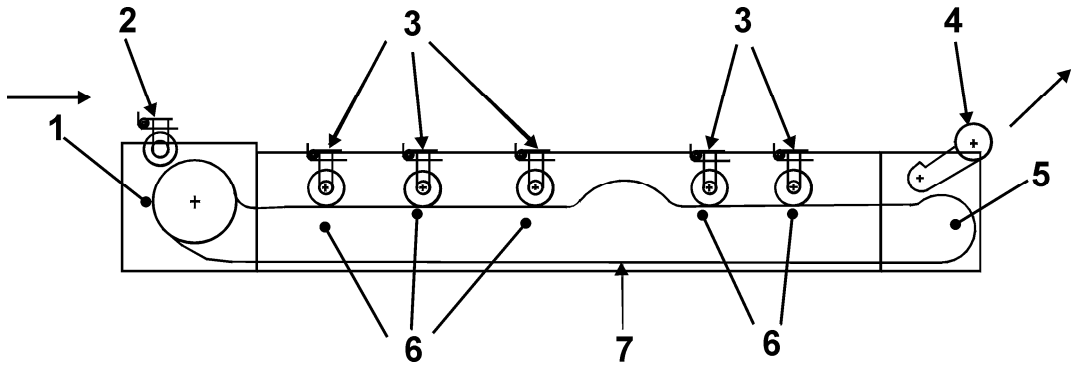
Key

1 Unwinding unit
2 Dancer roller
3 Stretch roller
4 Smoothing section
5 Upper smoothing roller
6 Lower smoothing roller
7 Embossing section
8 Embossing rollers
9 Longitudinal cutting section
10 Aligning section
11 Longitudinal folding section
12 Sheeter cylinder
13 Cross folding cylinder
14 Waste suction device
15 Counting and transfer section

Figure 27 — Machine for the production of sanitary items

5.3.3 Inserting machines (Figure 28)

5.3.3.1 On inserting machines using manual feeding of feeders, the danger zones of the separating elements of the feeder (main product feeders and insert feeders) shall be safeguarded in accordance with 5.3.4.8 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ and the residual pile monitoring device shall be provided in accordance with 5.2.6.1.5 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.



Key

1 Drive section
2 Main product feeder
3 Insert feeder
4 Delivery section
5 Turning section
6 Inserting section
7 Transport chain

Figure 28 — Inserting machine

5.3.3.2 On machines provided with automatic feeders where manual intervention is not required and the material used makes access difficult, safeguarding shall be achieved by providing tunnel-type guards arranged with a safety distance of 550 mm from the nearest danger zone instead of the measures required in 5.3.3.1.

5.3.3.3 Danger zones of the transport device and drive elements shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.3.3.4 Inserting machines with an overall length of more than 7 m shall be provided with a start-up warning device according to 5.2.7.2 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.

5.3.3.5 Starting the machine with the interlocking guards in the open position and with a hold-to-run speed higher than 10 m/min shall be possible only by means of two-hand control and only if

— zones with restricted view and mutual interlocking as described in 5.2.3.4 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ are provided and

— a selector switch for this kind of operation is provided and

— the hold-to-run speed is the slowest speed possible under procedural requirements.

For further information in the instruction handbook, see 7.1.5.

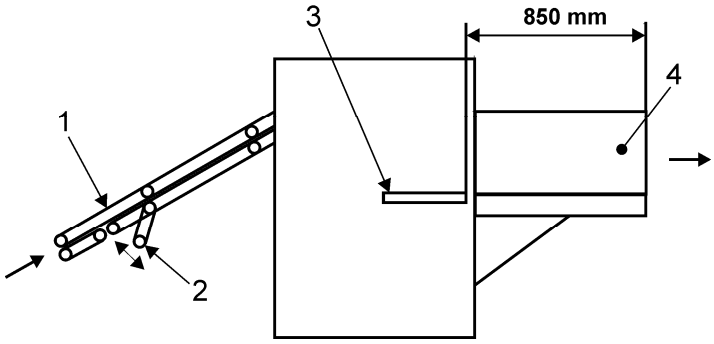
5.3.3.6 Emergency stop buttons shall be provided on each main control panel a maximum of 5 m apart.

5.3.4 Counter-stackers

5.3.4.1 The drawing-in zones of the feeding and delivery belts shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.3.4.2 The crushing zones of the waste separator (see Figure 27) shall be safeguarded. This can be achieved by limiting the closing force to 200 N.

5.3.4.3 The shearing zones of the turntable shall be protected by fixed guards or by guards interlocked with the hazardous movement. Guard openings shall be designed to comply with the safety distances of Table 4 of EN 294:1992. At least one side of the turntable shall be protected by a guard interlocked with the hazardous movement in order to allow access for the removal of jams.



Key

1 Feeding belt
2 Waste separator
3 Turntable
4 Delivery tunnel with delivery belt

Figure 29 — Counter-stacker

5.3.4.4 On the side where the stacked material is delivered, access to the turntable shall be prevented by a fixed guard or by a tunnel-type guard interlocked with the hazardous movement. The safety distance to the danger zone shall be at least 850 mm.

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

5.3.4.6 An emergency stop button shall be provided on the main control panel. The pneumatic system of the counter-stacker including any accumulators shall be depressurized automatically when the emergency stop button is actuated.

5.3.5 Paper embossing machine

5.3.5.1 Paper embossing machines with an overall length of more than 7 m shall be provided with a start-up warning device according to 5.2.7.2 of ⟦A1⟧ EN 1010-1:2004+A1 ⟦A1⟧.

5.3.5.2 The requirements for web threading devices in accordance with 5.2.3.5 of ⟦A1⟧ EN 1010-1:2004+A1 ⟦A1⟧ shall be met

5.3.5.3 The reel unwinding and rewinding units shall be safeguarded according to 5.3.5 of ⟦A1⟧ EN 1010-1:2004+A1 ⟦A1⟧.

5.3.5.4 The drawing-in zones between the guide rollers and between the guide rollers and fixed machine parts shall be safeguarded. This can be achieved by providing

— a minimum distance between rollers of 120 mm or

— fixed guards or guards interlocked with the hazardous movement according to 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1].

5.3.5.5 Stretch rollers and counter rollers shall be a minimum of 120 mm apart (clearance between the two rollers).

5.3.5.6 The drawing-in zone between the embossing roller and counter roller shall be protected by fixed guards or guards interlocked with the hazardous movement in accordance with 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1].

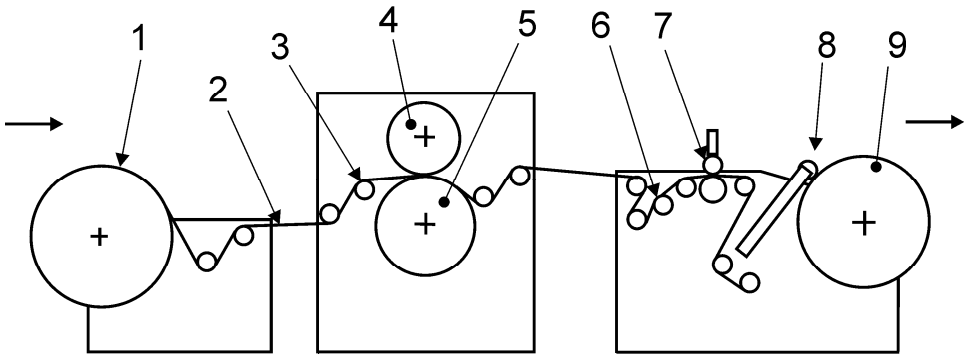
5.3.5.7 The movement of the counter-roller when travelling into and out of position shall be safeguarded. This can be achieved by

— hold-to-run control in accordance with 5.2.3.2. a)2) of [A1] EN 1010-1:2004+A1 [A1]

or

— a speed of < 0,5 m/min. An emergency stop button shall be available in the vicinity.

For further information in the instruction handbook, see 7.1.5.



Key

1 Unwinding unit
2 Paper web
3 Stretch roller
4 Embossing roller
5 Counter roller
6 Guide rollers
7 Cutting unit
8 Drive roller
9 Rewinding unit

Figure 30 — Paper embossing machine

5.3.5.8 Where embossing rollers are heated, a sign shall be fitted to the machine warning the operator of hot machine parts.

For further information in the instruction handbook, see 7.1.8.

Hot pipes (e.g. steam pipes, oil pipes) shall have adequate insulation up to a height of 2,7 m in accordance with 5.2.14 of [A1] EN 1010-1:2004+A1 [A1].

5.3.5.9 The rotary knives of the cutting unit shall be safeguarded according to 5.3.2 of [A1] EN 1010-1:2004+A1 [A1].

5.3.5.10 An emergency stop system shall be provided with emergency stop buttons on each main control panel.

5.4 Finishing machines

5.4.1 Coaters

5.4.1.1 Machines where overall vision is difficult shall be provided with a start-up warning device according to 5.2.7.2 of [A1] EN 1010-1:2004+A1 [A1].

5.4.1.2 The requirements for web threading devices shall be met in accordance with 5.2.3.5 of [A1] EN 1010-1:2004+A1 [A1].

5.4.1.3 Reel unwinding and rewinding units shall be safeguarded according to 5.3.5 of [A1] EN 1010-1:2004+A1 [A1].

5.4.1.4 Where drawing-in zones between the guide rollers and between the guide rollers and fixed machine parts cannot be safeguarded by applying the minimum clearance of 120 mm, guards shall be provided in accordance with 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1].

5.4.1.5 The drawing-in zone of the dosing gap (see Figure 34) shall be guarded.

5.4.1.6 Where hotmelt material is used for coating, contact with hot parts shall be prevented by fixed guards.

5.4.1.7 Where hazardous substances are being used, the machine shall be equipped with local exhaust equipment at the applicators.

The exact requirements for exhaust equipment shall be in line with the specific substances used.

For further information in the instruction handbook, see 7.1.6.1.

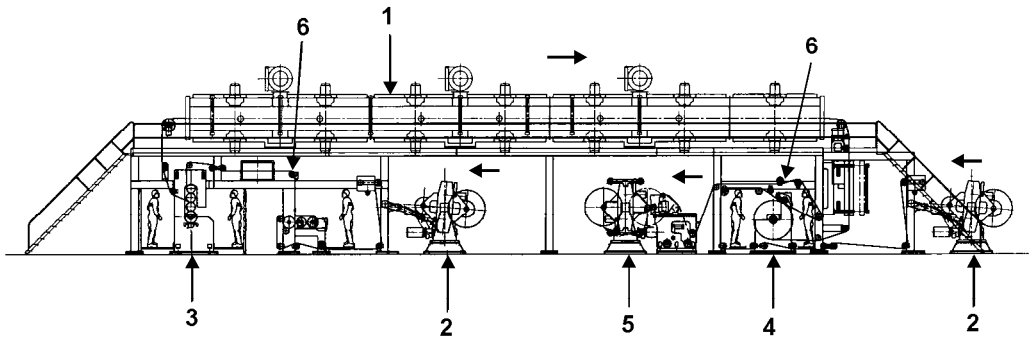
5.4.1.8 The drawing-in zone in the coating unit (see Figure 31, item 3) between the coating roller and cooling roller/coating roller shall be protected by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1].

5.4.1.9 The engaging and disengaging movement of the coating rollers or coating roller and cooling roller shall be safeguarded. This can be achieved by

— hold-to-run control in accordance with 5.2.3.2 a)2) of [A1] EN 1010-1:2004+A1 [A1]

or

— guards interlocked with the hazardous movement.

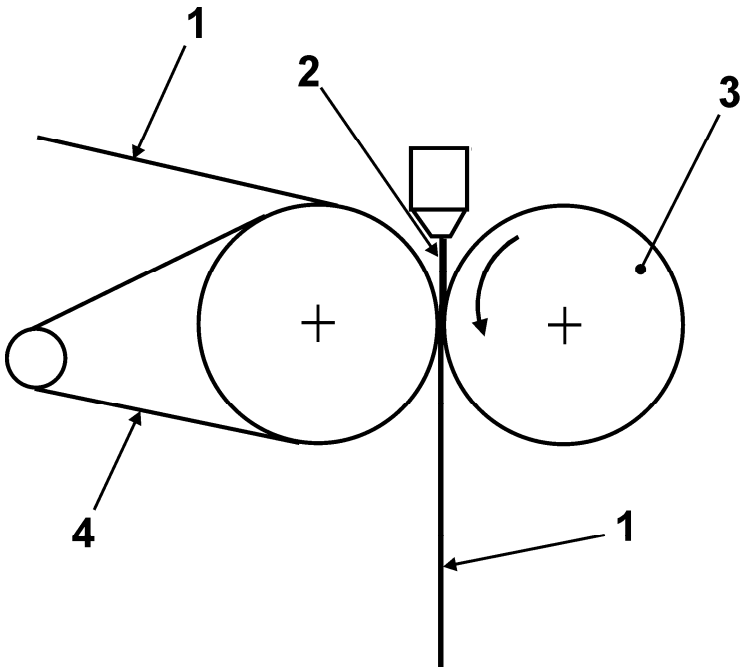


Key

1 Dryer
2 Unwinding unit
3 Coating unit
4 Laminating unit
5 Rewinding unit
6 Guide rollers

Figure 31 — Coating and laminating machine

5.4.1.10 The drawing-in zones of the Teflon belt shall be safeguarded (see Figure 32) shall be protected by fixed guards or guards interlocked with the hazardous movement in accordance with 5.2.1.1 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩.



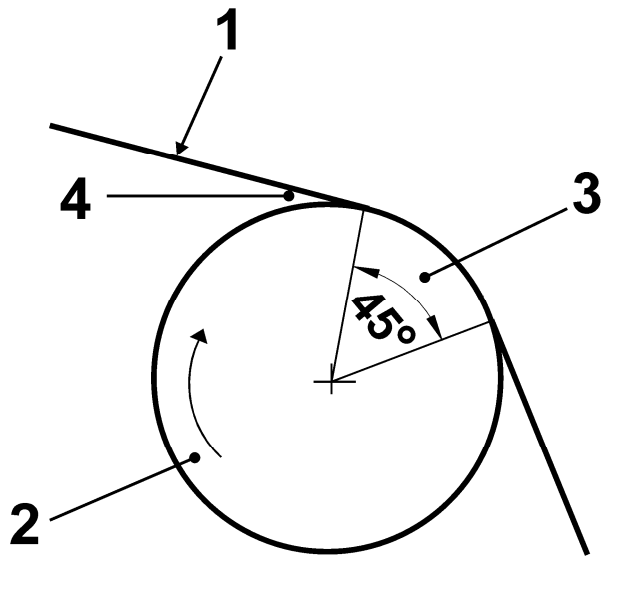
Key

1 Material web
2 Polyethylene (PE)
3 Cooling roller
4 Teflon belt

Figure 32 — Coating with polyethylene

5.4.1.11 The requirements for explosion prevention and protection specified in 5.2.4 of ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ shall be complied with.

5.4.1.12 The drawing-in zones between the coated, tear-resistant material web and guide rollers (see Figure 33, item 4) that can be accessed in the machine from passage ways and have a wrapping angle of 45° or more shall be protected by fixed guards.



Key

1 Coated web
2 Guide roller
3 Wrapping angle
4 Drawing-in zone

Figure 33 — Wrapping angle on guide rollers

5.4.1.13 Continuous flow dryers

5.4.1.13.1 If coating material is used releasing flammable substances during the drying process, the requirements of EN 1539:2000 shall be satisfied.

For further information in the instruction handbook, see 7.1.6.2.

5.4.1.13.2 The danger zone when closing the upper and the lower part of the dryer shall be safeguarded. This can be achieved by

— hold-to-run control or

— trip bars. Automatic closing shall only be possible if the aperture between the upper and lower parts of the dryer does not exceed 300 mm.

5.4.1.13.3 Ignition of the material web when passing through the continuous flow dryer shall be prevented. Ignition is prevented by

— stopping the coating unit or

— stopping the machine

while ensuring that the performance of the continuous flow dryer is adequately reduced and the material web is kept an adequate distance from the source of radiation by an air wiper, if necessary.

5.4.1.13.4 The surface temperature of parts accessible from the outside shall not exceed the limit values of 5.2.14 of [A1] EN 1010-1:2004+A1 [A1].

5.4.1.13.5 In order to prevent the dryer from falling shut unintentionally due to leakage or hose breakage in the hydraulic or pneumatic cylinder system, overridable safety rated check valves shall be fitted to the pneumatic or hydraulic cylinders..

5.4.1.13.6 Mechanical devices shall be provided to secure the dryer open during maintenance operations.

These can be struts, for example, inserted during the maintenance work.

For further information in the instruction handbook, see 7.1.6.3.

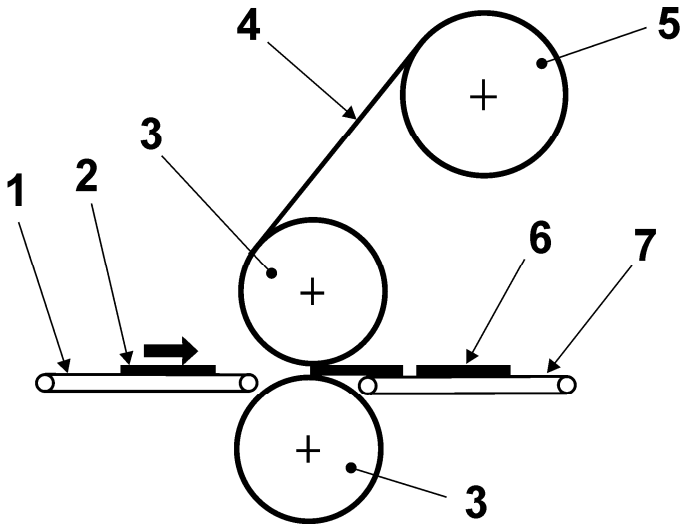
5.4.1.14 An emergency stop system shall be provided with emergency stop buttons at each operator position.

5.4.2 Laminators

5.4.2.1 Foil laminators (with adhesive foil)

5.4.2.1.1 The requirements for reel unwinding and rewinding units shall comply with 5.3.5 of [A1] EN 1010-1:2004+A1 [A1].

5.4.2.1.2 On machines where single sheets are fed manually, the drawing-in zones of the feeding and delivery belts shall be provided with fixed guards.



Key

1 Feeding belt
2 Substrate (single sheet)
3 Laminating roller
4 Foil web
5 Unwinding unit
6 Laminated single sheets
7 Delivery belt

Figure 34 — Foil laminator

5.4.2.1.3 The drawing-in zones between guide rollers and between guide rollers and fixed machine parts shall be safeguarded by applying the minimum distance of 120 mm or by guards according to 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1].

5.4.2.1.4 The drawing-in zones between the tear-resistant web and guide rollers (see Figure 33, item 4) accessible in the machine from passage ways and which have a wrapping angle of 45 ° or more shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.4.2.1.5 The engaging and disengaging movement of the laminating rollers for making ready and cleaning shall be safeguarded by

— a maximum hold-to-run speed of 5 m/min

or

— guards interlocked with the hazardous movement.

5.4.2.1.6 The drawing-in zone of the laminating rollers shall be protected by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1]. Where the thickness of the web material is 18 mm or more, the opening width shall not exceed 30 mm and the safety distance shall be at least 200 mm.

5.4.2.1.7 Where hot foil is used for lamination, the heatable lamination rollers shall be protected against contact by guards in accordance with 5.2.14 of [A1] EN 1010-1:2004+A1 [A1].

5.4.2.1.8 Where cutting devices are used, they shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement.

5.4.2.1.9 An emergency stop system shall be provided with emergency stop buttons on each main control panel.

5.4.2.2 Laminators with glue application

5.4.2.2.1 Machines with an overall length of more than 7 m shall be provided with a start-up warning device according to 5.2.7.2 of [A1] EN 1010-1:2004+A1 [A1].

5.4.2.2.2 The requirements for web threading devices in accordance with 5.2.3.5 of [A1] EN 1010-1:2004+A1 [A1] shall be fulfilled.

5.4.2.2.3 The requirements for reel unwinding and rewinding units (see Figure 31) shall comply with 5.3.5 of [A1] EN 1010-1:2004+A1 [A1].

5.4.2.2.4 The feeder for the laminating material and delivery unit shall be safeguarded according to 5.3.4 of [A1] EN 1010-1:2004+A1 [A1].

5.4.2.2.5 Drawing-in zones of belts shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.4.2.2.6 The drawing-in zones between the guide rollers and between guide rollers and fixed machine parts shall be safeguarded by applying the minimum distance of 120 mm or by guards according to 5.2.1.1 of [A1] EN 1010-1:2004+A1 [A1].

5.4.2.2.7 The drawing-in zones between the tear-resistant web and guide rollers (see Figure 33) accessible in the machine from passage ways and with a wrapping angle of 45° or more shall be protected by fixed guards or by guards interlocked with the hazardous movement.

5.4.2.2.8 Where rotary knives (see Figure 36, item 5) are used, they shall be safeguarded according to 5.3.2 of [A1] EN 1010-1:2004+A1 [A1].

5.4.2.2.9 The drawing-in zones of the sheet feed rolls (see Figure 36, item 6) shall be safeguarded. This can be achieved by ensuring that

— the rolls have a displacement of at least 25 mm

or

— roller contact is by their own weight.

5.4.2.2.10 Drawing-in zones of the glue rollers (see Figure 36, item 7) and the dosing gap (see Figure 33) shall be protected by guards interlocked with the hazardous movement.

5.4.2.2.11 The drawing-in zone between the laminating rollers (see Figure 36, item 9) shall be protected by fixed guards or by guards interlocked with the hazardous movement in accordance with 5.2.1.1 of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧. Where the thickness of the web material is 18 mm or more, the opening width shall not exceed 30 mm and the safety distance shall be at least 200 mm.

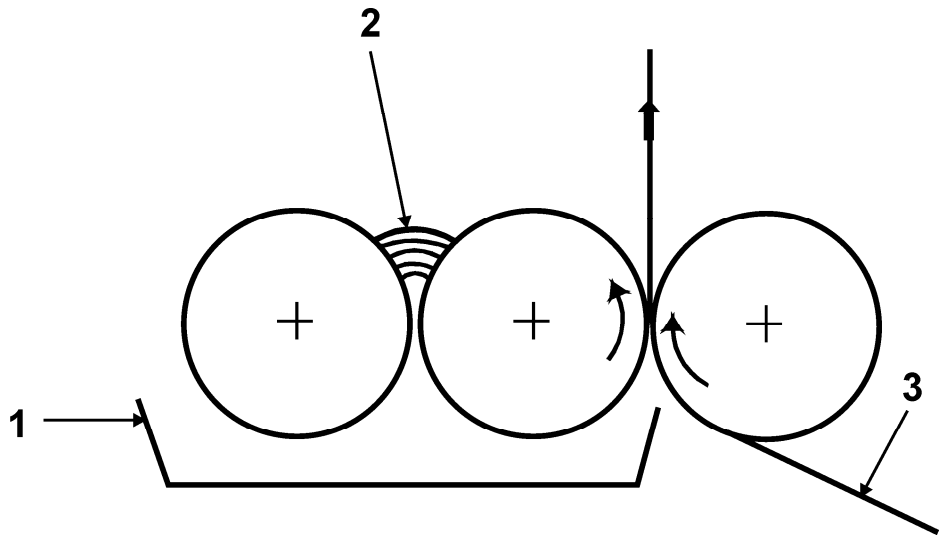
5.4.2.2.12 The opening and closing movement of the laminating rollers shall be safeguarded where the travel path is more than 6 mm.

This can be achieved by

— hold-to-run control in accordance with 5.2.3.2 a)2) of ⟦A1⟩ EN 1010-1:2004+A1 ⟨A1⟧

or

— guards interlocked with the hazardous movement.



Key

1 Collecting pan
2 Dosing gap
3 Material web

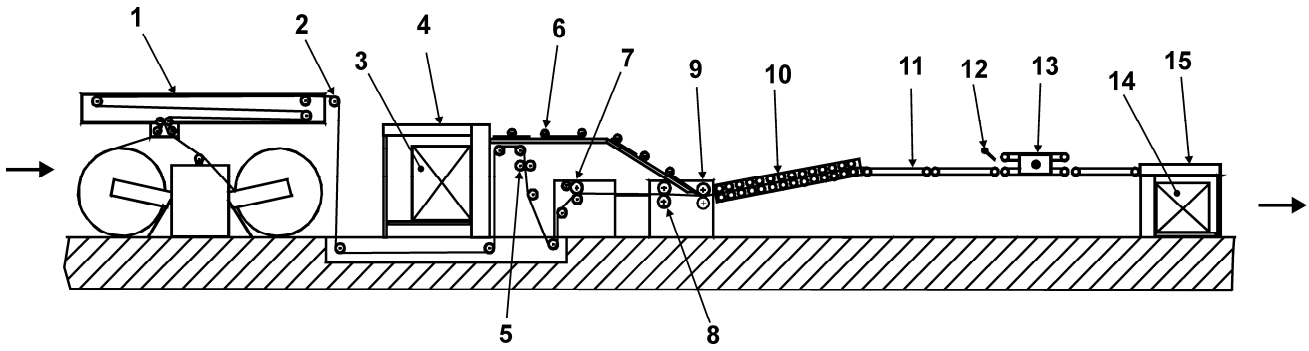
Figure 35 — Dosing gap

5.4.2.2.13 Danger zones of the sheeter (see Figure 36, item 8) shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement.

5.4.2.2.14 The drawing-in zones between pressing rollers and guide rollers and pressing belts (see Figure 36, item 10) shall be safeguarded by

— fixed guards or guards interlocked with the hazardous movement or

— ensuring that the pressure rollers are held in position by their own weight and have a displacement of at least 120 mm.



Key

1 Unwinding unit
2 Guide roller
3 Pile
4 Feeder
5 Rotary knives
6 Transport rolls
7 Gluing unit
8 Sheeter
9 Laminating rollers
10 Pressing belt
11 Transport belt
12 Package stop
13 Turning belt
14 Pile
15 Delivery unit

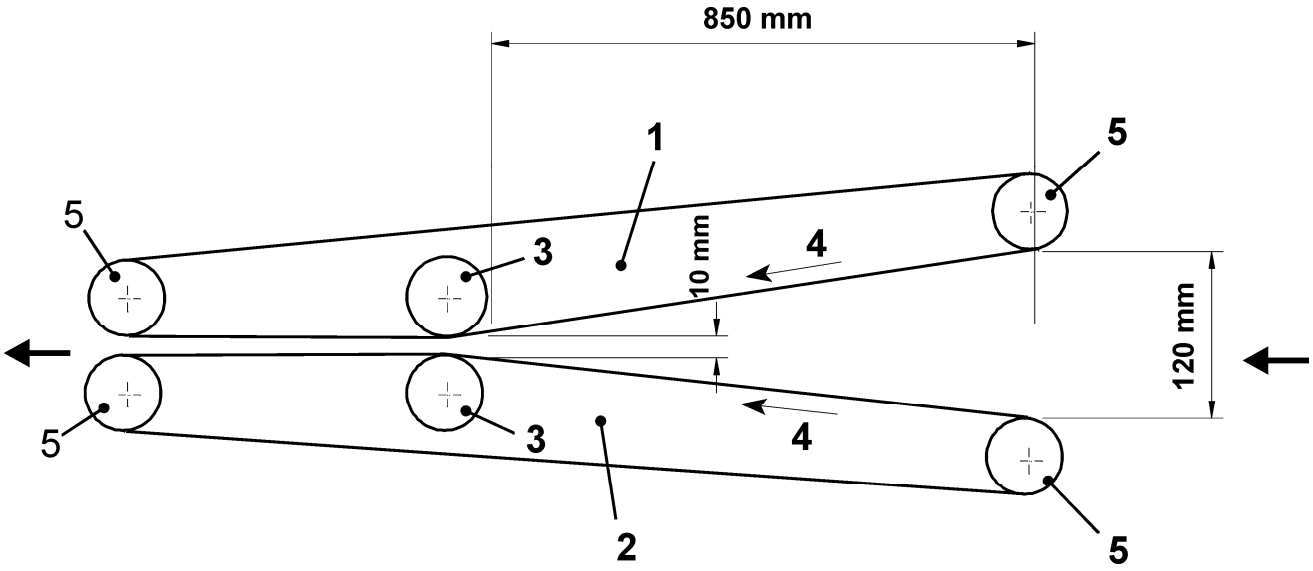
Figure 36 — Web-fed laminator for sheet material

5.4.2.2.15 On pressing belts, the drawing-in zone between upper and lower pressing belts at the infeed point shall be safeguarded by one of the following measures:

— guards in accordance with 5.2.1.1 a) of ▌A1⟩ EN 1010-1:2004+A1 ⟨A1▐,

— safety distance of 850 mm measured from the point of entrance of the pressing belt up to that point where there is a distance of at least 10 mm between the pressing belts with a pressure belt entrance aperture of at least 120 mm (Figure 35) and guards on the sides,

— displacement of press rollers accessible in the 850 mm area adequate to ensure a clear distance of at least 120 mm between the pressing belts with the maximum pressing force of the press rollers not exceeding 200 N and guards on the sides.



Key

1 Upper pressing belt
2 Lower pressing belt
3 Pressure rollers
4 Direction of belt
5 Guide rollers

Figure 37 — Pressing belt

5.4.2.2.16 The crushing zone between the package stop and transport belt (see Figure 36, item 12) shall be safeguarded by

— fixed guards or guards interlocked with the hazardous movement

or

— limiting the contact force to a maximum of 200 N

5.4.2.2.17 On the turning belt, shearing points between the turning belt (see Figure 36, item 13) and the preceding and the following transport belt shall be safeguarded by fixed guards or by guards interlocked with the hazardous movement.

5.4.2.2.18 The requirements for explosion prevention and protection with regard to glues containing solvents shall comply with 5.2.4 of [A1] EN 1010-1:2004+A1 [A1].

If continuous flow dryers are fitted, the requirements of 5.6.2 of prEN 1010-2:2003 shall be met.

5.4.2.2.19 An emergency stop system shall be provided with emergency stop buttons at each operator position.

6 Verification of safety requirements and/or measures

Table 2 describes methods used to verify whether the safety requirements and measures described in Clause 5 are complied with. It also contains references to the respective clauses of this standard.

Table 2 — Methods used to verify safety requirements and measures

A — Visual inspection, B — Functional test, C — Measuring, D — Drawings and calculations

Clause	Safety requirements and/or measures	A Note 1	B Note 2	C Note 3[A]	D Note 4
5.1 General					
5.1.1	Measures in according to EN 292, [A1] EN 1010-1:2004+A1 [A1]	x	x		
5.1.2	Guards interlocked with the hazardous movement	x	x		
5.1.3	Electrical equipment	x	x		
5.1.4	Safety-related control circuits	x	x		x
5.1.5	Integrated machine lines				
5.2.1 Stitching, riveting, eyeletting and attaching machines					
5.2.1.1	Safeguarding of danger zone between upper and lower tool	x	x	x	
5.2.1.2	Adjustable guards	x	x	x	
5.2.1.3	Two-hand control, hold-to-run control	x	x	x	
5.2.1.4	Control systems	x	x	x	x
5.2.2 Gang stitchers					
5.2.2.1	Safeguarding separating elements of feeder, residual pile monitoring	x	x		
5.2.2.2	Tunnel guards for automatic loading of feeder	x	x	x	
5.2.2.3	Guards on feeder	x	x	x	
5.2.2.4	Safeguarding of stitching section	x	x	x	
5.2.2.5	Drawing-in zone of calliper roll for thickness control	x	x	x	
5.2.2.6	Start-up warning device	x	x	x	
5.2.2.7	Safety distance on transport chains	x	x	x	
5.2.2.8	Hold-to-run control with guards open	x	x	x	
5.2.2.9	Emergency stop buttons	x	x		
5.2.2.10	Trimmer	x	x	x	
5.2.3 Gathering machines					
5.2.3.1	Safeguarding of separating elements, residual pile monitoring	x	x		

Table 2 *(continued)*

Clause	Safety requirements and/or measures	A Note 1	B Note 2	C Note 3[A]	D Note 4
5.2.3.2	Devices for muting residual pile monitoring on feeders that are not used	x	x		
5.2.3.3	Tunnel guards on automatic loading unit of feeders	x	x		
5.2.3.4	Minimum distances on transport chains, trip bars for manual feeding, tunnel guards	x	x	x	
5.2.3.5	Safeguarding gathering devices (transport devices)	x	x		
5.2.3.6	Start-up warning device	x	x		
5.2.3.7	Hold-to-run control with guards open	x	x	x	
5.2.3.8	Emergency stop buttons	x	x		
5.2.4 Perfect binder					
5.2.4.1	Guards on book clamps	x	x		
5.2.4.2	Safeguarding of glue rollers, glue applicators	x	x		
5.2.4.3	Temperature control and limit temperature monitoring of hotmelt, exhaust devices	x	x		
5.2.4.4	Exhaust systems for PUR hotmelt	x	x	x	
5.2.4.5	Handling of PUR hotmelt	x	x		
5.2.4.6	Protection against contact with hot surfaces	x	x		
5.2.4.7	Recommended values for UV radiation, HF radiation (radiation dryers)	x	x	x	
5.2.4.8	Residual pile monitoring, safeguarding of separating elements	x	x		
5.2.4.9	Safeguarding of delivery opening	x	x	x	
5.2.4.10	Start-up warning device	x	x		
5.2.4.11	Hold-to-run control with guards open	x	x		
5.2.4.12	Safety devices on milling head cutters	x	x		
5.2.4.13	Emergency stop buttons	x	x	x	
5.2.5 Paper drills					
5.2.5.1	Hold-to-run control for lifting movement	x	x		
5.2.5.2	Safeguarding of multi-drill machines	x	x	x	
5.2.6 Book signature presses					
5.2.6.1	Safeguarding of closing movement pressing plate by hold-to-run control	x	x		x
5.2.7 Book presses					
5.2.7.1	Trip device	x	x	x	
5.2.7.2	Guards between movable pressing plates	x	x		

Table 2 *(continued)*

Clause	Safety requirements and/or measures	A Note 1	B Note 2	C Note 3[A]	D Note 4
5.2.7.3	Minimum distances between pressing plate and machine enclosure	x	x	x	
5.2.8 Sheet folding machines					
5.2.8.1	Guards on folding rollers	x	x		
5.2.8.2	Safeguarding of cutting, creasing and perforating devices	x	x		
5.2.8.3	Safeguarding of folding knife danger zone	x	x		
5.2.8.4	Hold-to-run control with guards open	x	x	x	x
5.2.8.5	Noise reduction	x	x	x	
5.2.8.6	Emergency stop buttons	x	x		
5.2.9 Book production lines (hard cover)					
5.2.9.1	Safeguarding of feed opening	x	x		
5.2.9.2	Guards on preheater section	x	x	x	
5.2.9.3	Safeguarding of back rounding and pressing section	x	x		
5.2.9.4	Guards on glue sections, automatic glue replenishment	x	x	x	
5.2.9.5	Temperature control and limitation of hot glue pan	x	x	x	
5.2.9.6	Guards on gauze section	x	x	x	
5.2.9.7	Guards on head banding and backlining section	x	x	x	
5.2.9.8	Safeguarding of danger zones of book cover feeder	x	x		
5.2.9.9	Guards on cover bending and rounding section	x	x	x	
5.2.9.10	Guards on casing-in section	x	x	x	
5.2.9.11	Hold-to-run control with guards open	x	x	x	
5.2.9.12	Emergency stop buttons	x	x		
5.2.9.13	Start-up warning device	x	x	x	
5.2.10 Back rounding and pressing machines					
5.2.10.1	Safeguarding of drawing-in zones of belts and feed openings	x	x	x	
5.2.10.2	Safeguarding of tipping section	x	x		
5.2.10.3	Guards on preheating section	x	x	x	
5.2.10.4	Warning of hot parts	x			
5.2.10.5	Guards on preforming, back rounding and pressing section	x	x	x	
5.2.10.6	Emergency stop buttons	x	x		

Table 2 *(continued)*

Clause	Safety requirements and/or measures	A Note 1	B Note 2	C Note 3[A]	D Note 4
5.2.11 Backlining and head banding machines					
5.2.11.1	Guards on feeding side	x	x	x	
5.2.11.2	Guards on glue section	x	x	x	
5.2.11.3	Guards on hot parts (hotmelt), warning	x	x	x	
5.2.11.4	Guards on gauze section	x	x	x	
5.2.11.5	Guards on head banding section	x	x	x	
5.2.11.6	Guards on counter-pressure section	x	x	x	
5.2.11.7	Emergency stop buttons	x	x		
5.2.12 Casing-in machines					
5.2.12.1	Guards on transport system, safeguarding of feed and discharge openings	x	x	x	
5.2.12.2	Safeguarding of book cover feeder	x	x		
5.2.12.3	Guards on cover bending section	x	x	x	
5.2.12.4	Guards on forming section	x	x	x	
5.2.12.5	Warning of hot parts	x			
5.2.12.6	Guards on casing-in section, gluing section	x	x	x	
5.2.12.7	Guards on counter-pressure section	x	x	x	
5.2.12.8	Guards on delivery side	x	x	x	
5.2.12.9	Emergency stop buttons	x	x		
5.2.13 Book cover crease forming machines (presses)					
5.2.13.1	Safeguarding of feed and delivery openings	x	x	x	
5.2.13.2	Guards on tipping section	x	x	x	
5.2.13.3	Guards on pressing section	x	x		
5.2.13.4	Warning of hot parts	x			
5.2.13.5	Hold-to-run control with guards open	x	x	x	x
5.2.13.6	Emergency stop buttons	x	x		
5.3.1 Machines for the production of envelopes					
5.3.1.1	Guards on reel stands	x	x	x	
5.3.1.2	Guards on feeder	x	x	x	
5.3.1.3.1	Guards of drawing-in zones in the printing unit	x	x	x	
5.3.1.3.2	Situation of printing unit after emergency stopping	x	x		

Table 2 *(continued)*

Clause	Safety requirements and/or measures	A Note 1	B Note 2	C Note 3[A]	D Note 4
5.3.1.4.1	Guards on cross scoring section	x	x	x	
5.3.1.4.2	Safeguarding of cross scoring knife	x	x		
5.3.1.5	Guards on form cutting section	x	x	x	
5.3.1.6.1	Guards on feed rollers, safeguarding of feeding aperture	x	x	x	
5.3.1.6.2	Safeguarding of delivery opening	x	x	x	
5.3.1.7	Guards on window cutting section	x	x	x	
5.3.1.8.1	Guards of drawing-in zones and feed openings	x	x	x	
5.3.1.8.2	Smooth surface of unwinding shaft	x	x		
5.3.1.8.3	Safeguarding of drawing-in zone between unwinding shaft and shaft bearing	x	x		
5.3.1.8.4	Safeguarding of splicing knife	x	x	x	
5.3.1.9.1	Guards of drawing-in zones of scraper gluing unit	x	x	x	
5.3.1.9.2	Safeguarding of glue unit after vertical lift-off	x	x	x	
5.3.1.10.1	Safeguarding of knife in separating cutting section	x	x	x	
5.3.1.10.2	Safeguarding of segment roller	x	x		
5.1.3.10.3	Safety distances of delivery aperture	x	x	x	
5.3.1.11.1	Guards of drawing-in zone of bottom flap folding section	x	x	x	
5.3.1.11.2	Safety distance of delivery opening	x	x	x	
5.3.1.12.1	Safeguarding of drawing-in zones of transport rolls	x	x	x	
5.3.1.12.2	Adequate displacement of transport rolls	x	x	x	
5.3.1.13.1	Safeguarding of danger zones on staggering wheel	x	x	x	
5.3.1.13.2	Minimum distance of paper guide supports on staggering wheel	x	x	x	
5.3.1.14.1	Safeguarding of roller gluing unit	x	x	x	
5.3.1.14.2	Safeguarding of drawing-in zone between dosing roller/scraper and duct roller	x	x	x	
5.3.1.14.3	Safeguarding of drawing-in zone between duct roller and applicator	x	x	x	
5.3.1.14.4	Situation of dosing and duct roller after an emergency stop	x	x		
5.3.1.15.1	Safeguarding of drawing-in zones of belts on hot air dryer	x	x		
5.3.1.15.2	Safeguarding of tilting nozzles	x	x		
5.3.1.15.3	Protection against hot surface temperatures	x	x	x	

Table 2 *(continued)*

Clause	Safety requirements and/or measures	A Note 1	B Note 2	C Note 3[A]	D Note 4
5.3.1.16	Guards on separation roller	x	x	x	
5.3.1.17	Guards on adjusting section	x	x		
5.3.1.18	Guards on seal flap folding section	x	x	x	
5.3.1.19.1	Safeguarding of danger zone between separating disc delivery unit and cylinder	x	x	x	
5.3.1.19.2	Safeguarding of danger zone between separating discs and delivery table	x	x	x	
5.3.1.20.1	Hold-to-run control with guards open	x	x	x	x
5.3.1.20.2	Starting for fault-finding with stroboscope	x	x	x	
5.3.1.21	Emergency stop buttons	x	x	x	
5.3.1.22	Noise reduction	x	x	x	
5.3.1.23	Start-up warning device	x	x	x	
5.3.2 Machines for the production of sanitary items					
5.3.2.1.1	Guards on belt drive	x	x		
5.3.2.1.2	Safety rated check valve on lifting cylinder	x	x		
5.3.2.1.3	Safeguarding of turret rotation	x	x	x	
5.3.2.1.4	Safeguarding of dancer roller	x	x		
5.3.2.2.1	Safeguarding of smoothing section	x	x	x	
5.3.2.2.2	Safeguarding of embossing rollers	x	x	x	
5.3.2.3	Safeguarding of rotary knives	x	x		
5.3.2.4	Hold-to-run control for automatic format setting in longitudinal folding section	x	x	x	
5.3.2.5	Conductivity of waste suction pipes	x	x		
5.3.2.6	Safety devices on counting and transfer section	x	x		
5.3.2.7	Guards on product checking section	x	x		
5.3.2.8.1	Safeguarding of band saw	x	x	x	
5.3.2.8.2	Safeguarding of water jet knives	x	x		x
5.3.2.9.1	Hold-to-run control with guards open	x	x	x	
5.3.2.9.2	Hold-to-run control, fault detection by stroboscope	x	x	x	
5.3.2.10	Noise reduction	x	x	x	
5.3.2.11	Emergency stop buttons	x	x	x	
5.3.2.12	Start-up warning device	x	x	x	

Table 2 *(continued)*

Clause	Safety requirements and/or measures	A Note 1	B Note 2	C Note 3[A]	D Note 4
5.3.3 Inserting machines					
5.3.3.1	Guards, residual pile monitoring on feeder	x	x		
5.3.3.2	Guards on automatic feeder	x	x	x	
5.3.3.3	Safety devices on transport device and drive elements	x	x		
5.3.3.4	Start-up warning device	x	x	x	
5.3.3.5	Hold-to-run control with guards open	x	x	x	
5.3.3.6	Emergency stop buttons	x	x		
5.3.4 Counter-stackers					
5.3.4.1	Safeguarding of drawing-in zones of belts	x	x		
5.3.4.2	Safeguarding of waste separator	x	x	x	
5.3.4.3	Guards on turntable	x	x	x	
5.3.4.4	Guards on delivery unit	x	x	x	
5.3.4.5	Depressurization of pneumatic system	x	x		
5.3.4.6	Emergency stop buttons	x	x		
5.3.5 Paper embossing machines					
5.3.5.1	Start-up warning device	x	x	x	
5.3.5.2	Requirements for web threading devices	x	x		
5.3.5.3	Safeguarding of reel unwinding and rewinding units	x	x		
5.3.5.4	Safeguarding of drawing-in zones of guide rollers	x	x	x	
5.3.5.5	Minimum distance on stretch rollers	x		x	
5.3.5.6	Safeguarding of drawing-in zone of embossing roller	x	x	x	
5.3.5.7	Safeguarding of travel of counter-roller	x	x	x	
5.3.5.8	Protection of hot pipes, warning signs	x	x	x	
5.3.5.9	Safeguarding of rotary knives	x	x		
5.3.5.10	Emergency stop buttons	x	x		
5.4.1 Coaters					
5.4.1.1	Start-up warning device	x	x	x	x
5.4.1.2	Requirements for web threading devices	x	x		
5.4.1.3	Safeguarding of reel unwinding and rewinding units	x	x	x	
5.4.1.4	Safeguarding of drawing-in zones of guide rollers	x	x	x	
5.4.1.5	Safeguarding of drawing-in zone of dosing gap	x	x		

Table 2 *(continued)*

Clause	Safety requirements and/or measures	A Note 1	B Note 2	C Note 3[A]	D Note 4
5.4.1.6	Guards for hotmelt material	x	x		
5.4.1.7	Extraction of hazardous substances	x	x		
5.4.1.8	Safeguarding of drawing-in zone between coating rollers	x	x		
5.4.1.9	Safeguarding of engaging/disengaging movement of coating rollers	x	x	x	
5.4.1.10	Safeguarding of drawing-in zones of belts (Teflon belt)	x	x		
5.4.1.11	Explosion prevention and protection	x			x
5.4.1.12	Safeguarding of drawing-in zone between tear-resistant material web and guide rollers	x	x		
5.4.1.13.1	Requirements for continuous flow dryers emitting inflammable substances	x	x	x	
5.4.1.13.2	Safeguarding of danger zone between upper and lower part of dryer	x	x	x	
5.4.1.13.3	Protection against ignition of material web	x	x	x	
5.4.1.13.4	Protection against contact with hot parts	x	x	x	
5.4.1.13.5	Safety rated check valves on lifting cylinders	x	x		
5.4.1.13.6	Measures during maintenance work	x	x		
5.4.1.14	Emergency stop buttons	x	x		
5.4.2.1	Foil laminators				
5.4.2.1.1	Safeguarding of reel unwinding and rewinding units	x	x	x	
5.4.2.1.2	Safeguarding of drawing-in zones of belts	x	x		
5.4.2.1.3	Safeguarding of drawing-in zones of guide rollers	x	x	x	
5.4.2.1.4	Safeguarding of drawing-in zones between tear-resistant foil and guide rollers	x	x	x	
5.4.2.1.5	Safeguarding of engaging/disengaging movement of laminating rollers	x	x	x	
5.4.2.1.6	Safeguarding of drawing-in zones between laminating rollers	x	x	x	
5.4.2.1.7	Protection against contact with hot parts	x	x		
5.4.2.1.8	Safeguarding of cutting points	x	x		
5.4.2.1.9	Emergency stop buttons				
5.4.2.2	Laminators with glue application				
5.4.2.2.1	Start-up warning device	x	x	x	
5.4.2.2.2	Requirements for web threading devices	x	x	x	
5.4.2.2.3	Safeguarding of reel unwinding and rewinding units	x	x	x	

Table 2 *(concluded)*

Clause	Safety requirements and/or measures	A Note 1	B Note 2	C Note 3[A]	D Note 4
5.4.2.2.4	Safeguarding of feeding and delivery units	x	x	x	
5.4.2.2.5	Safeguarding of drawing-in zones of belts	x	x		
5.4.2.2.6	Safeguarding of drawing-in zones of guide rollers	x	x		
5.4.2.2.7	Safeguarding of drawing-in zones between laminated tear-resistant web and guide rollers	x	x		
5.4.2.2.8	Safeguarding of rotary knives	x	x	x	
5.4.2.2.9	Safeguarding of transport rolls	x	x	x	
5.4.2.2.10	Safeguarding of drawing-in zone of glue rollers and dosing gap	x	x		
5.4.2.2.11	Safeguarding of drawing-in zone between laminating rollers	x	x	x	
5.4.2.2.12	Safeguarding of traversing movement of laminating rollers	x	x	x	
5.4.2.2.13	Guards on sheeters	x	x	x	
5.4.2.2.14	Safeguarding of drawing-in zones of pressing belt	x	x	x	
5.4.2.2.15	Safeguarding of drawing-in zone between upper and lower pressing belt	x	x	x	
5.4.2.2.16	Safeguarding of danger zone of package stop	x	x		
5.4.2.2.17	Safeguarding of danger zones of turning belt	x	x	x	
5.4.2.2.18	Explosion prevention and protection	x		x	x
5.4.2.2.19	Emergency stop buttons	x	x		

Note 1 Inspection is a visual means of checking whether the characteristics and properties of the equipment and components supplied are appropriate for the specific application.

Note 2 The functional test will show whether the parts in question function in such a way as to satisfy the specific requirements.

Note 3 Verification by means of measuring instruments is used to check whether the requirements are fulfilled within the specified limits.

Note 4 Drawings and calculations are used to check whether the design characteristics of the components used satisfy the specific requirements.

[A] With regard to noise, compliance with the safety requirements and measures shall be verified as follows: the noise emission values such as the emission sound pressure level at the workstation and the sound power level shall be determined according to prEN 13023 and declared as dual-number declarations according to EN ISO 4871.

7 Information for use

7.1 Instruction handbook

7.1.1 Stitching, riveting, eyeletting and attaching machines

For stitching, riveting, eyeletting and attaching machines with adjustable guards, the instruction handbook shall contain clear and easily understandable instructions (sketches) for the safe adjustment of the guards.

7.1.2 Perfect binders

7.1.2.1 Where the production process does not allow the milling cutters to be stopped when opening the interlocking guard covering the book clamps (milling cutter can get stuck in the book signature and is liable to break), the instruction handbook shall indicate the residual risk caused by stopping the milling cutter. In addition, a warning sign shall be provided in the vicinity of the milling cutter.

7.1.2.2 Where the production process requires the perfect binder with interlocking guards open to be started with higher hold-to-run speeds, there is a residual risk requiring the instruction handbook to indicate that the person operating the hold-to-run/two-hand control shall ensure that there is no other person in the danger area before operating the control.

7.1.2.3 Where polyurethane hotmelt (PUR hotmelt) glues are used, the instruction handbook shall give the following information:

— Indication of the need for adequate exhaust equipment in the area of the glue duct and the preheater specifying the minimum exhaust volume;

— instructions for removing hot glue ducts from the perfect binder and for cleaning the glue ducts (for example, move directly under exhaust hood, clean duct with low-risk non-aromatic substances);

— indication of the need for adequate ventilation of the working area;

— indication of the need to follow the instructions of the material safety data sheet;

— warning not to leave glue reservoirs and glue ducts open;

— instructions for the use of protective masks with appropriate filter where, during glue reservoir changing, removal of glue ducts from the perfect binder and cleaning the glue ducts, it cannot be excluded that isocyanates are released;

— where the hazard of spilling the hot glue exists, the requirement that appropriate protective glasses and gloves shall be used. Eye washing and cleaning equipment should be readily available in case glue has been splashed into the eyes. For glue splashed on the skin, washing facilities should be available in the working area;

— thorough hand cleaning after work and before breaks as PUR can have a sensitising effect. Operating personnel dealing with this type of glue should use hand cream containing tanning agents;

— clothes soiled with glue should be changed immediately.

7.1.3 Machines for the production of envelopes

7.1.3.1 The instruction handbook shall contain a warning of the residual risk existing between staggering wheels in the vicinity of paper guides if operator intervention is required when starting the machine.

7.1.3.2 Where the use of stroboscopes is required for fault-finding and trouble-shooting, a residual risk exists as machines are required to run with very high hold-to-run speeds with guards open. The instruction

handbook shall contain a warning to this effect and shall also instruct the person operating the hold-to-run/two-hand control to ensure that there is no other person in the danger area before operating the control.

7.1.3.3 The instruction handbook shall indicate that dosing and the duct rollers will continue to run after emergency stopping. It shall contain an instruction that, for inspection and repair, the main switch shall be disconnected and be secured against resetting.

7.1.3.4 The instruction handbook shall contain a warning about residual risks. A general warning sign shall be provided on the machine (pictogram warning of hand injury).

7.1.4 Machines for the production of sanitary items

7.1.4.1 Where the use of stroboscopes is required for fault-finding and trouble-shooting, a residual risk exists as machines are required to run with very high hold-to-run speeds with guards open. The instruction handbook shall contain a warning to this effect and shall also instruct the person operating the hold-to-run/two-hand control to ensure that there is no other person in the danger area before operating the control.

7.1.4.2 The instruction handbook shall give information on adjusting the tunnel on the band saw on the delivery side. It shall be pointed out that there is a risk of cutting if guards are not adjusted to the format size of the product.

7.1.5 Paper embossing machines

The instruction handbook shall give information on the residual risk caused by the travelling movement at low speeds. The operator is required to ascertain the position of the emergency stop button beforehand.

7.1.6 Coaters

7.1.6.1 The instruction handbook shall indicate that the exhaust equipment shall be rated for the specific substances used. The manufacturers of such substances shall be consulted.

7.1.6.2 The instruction handbook shall give information on the substances for which the continuous flow dryer is designed with a clear indication if the continuous flow dryer is not suitable for use with solvent-containing substances.

7.1.6.3 An instruction shall be given to ensure that, for maintenance and inspection, the mechanical devices provided for safeguarding the persons working in the dryer are being used.

7.1.7 Hold-to-run speeds of above 10 m/min under two-hand control

Where it is required for production reasons to start machines with guards open under two-hand control with a speed of more than 10 m/min, a residual risk exists. The instruction handbook shall therefore inform the person operating the two-hand control to ensure that there is no other person in the danger area before operating the control.

7.1.8 High contact temperatures

The instruction handbook shall give information about hot parts existing on the machine and shall warn of the risk of burning where guards can be opened.

In the vicinity of hot parts, warning signs shall be provided on the machine giving pictograms of the risk involved (warning of hot surfaces).

Annex A
(normative)

General requirements

A.1 Production lines

Where machines are set up to form integrated lines (production lines) with one overall control system, any additional risks caused by such integrated arrangements (for example, integrated book production lines) shall be subject to a risk assessment

The requirements for individual machines shall remain valid (for example, requirements regarding the hold-to-run operation).

WG1 of TC 198 is of the opinion that this annex should be included in ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ when next revised.

A.2 Start-up warning device

The control system of the start-up warning device shall comply with category B.

WG 1 of TC 198 is of the opinion that this annex should be included in ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ when next revised.

A.3 Limit values for interlocking guards

An interlocking device with guard locking is required where the opening width of the guard when being moved out of its safeguarding position up to the position reached when the position detector is actuated (stopping the machine) does not comply with the value required as given in Table A.1 below.

Table A.1 — Limit values for interlocking safety devices

Safety distance "sr" between opening and danger zone	Admissible opening width "e" of the safety device when changing the position of the position detector
sr < 80 mm	e ≤ 30 mm
80 mm ≤ sr < 500 mm	e ≤ 40 mm
500 mm ≤ sr < 850 mm	e ≤ 80 mm
sr ≥ 850 mm	e ≤ 160 mm

Interlocking with guard locking is also required where the hazardous movement cannot be stopped within at least 10 s after actuation of the position detector.

WG 1 of TC 198 is of the opinion that this annex should be included in ⟨A1⟩ EN 1010-1:2004+A1 ⟨A1⟩ when next revised, but that it should not apply to Part 3.

Annex ZA
(informative)

A1 Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide one means of conforming to Essential Requirements of the New Approach Directive Machinery 98/37/EC, amended by 98/79/EC.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

WARNING - Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard. A1

Annex ZB
(informative)

A1 Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC on machinery.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard. A1

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